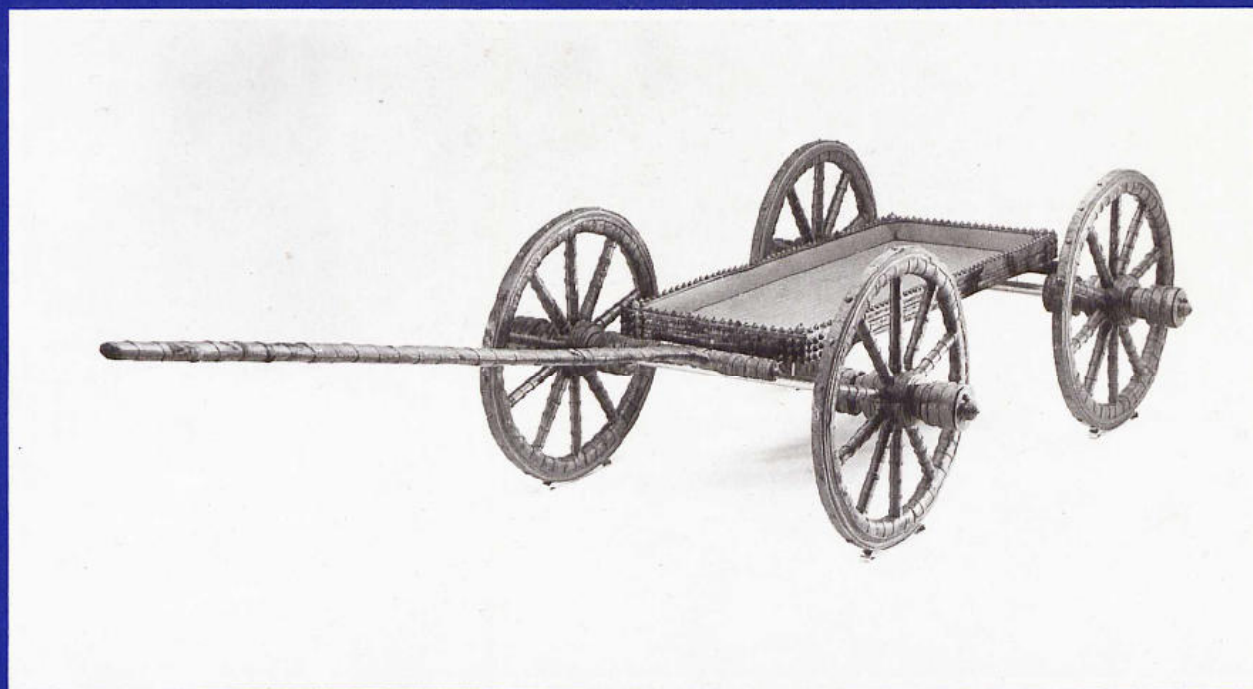


Wagons and Wagon-Graves of the Early Iron Age in Central Europe

C. F. E. Pare



Oxford University Committee for Archaeology

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*Dedicated to Professor Georg Kossack,
with thanks for much help and encouragement.*

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Abbreviations

ar.	arrondissement
BH	Bezirkshauptmannschaft
c.	commune
dép.	département
Gde.	Gemeinde
gm.	gmina
jud.	judet

Kom.	Komitat (megye)
Kt.	Kanton (Canton)
okr.	okres
pow.	powiat
Prov.	Provincie
Reg.-Bez.	Regierungs-Bezirk
woj.	województwo

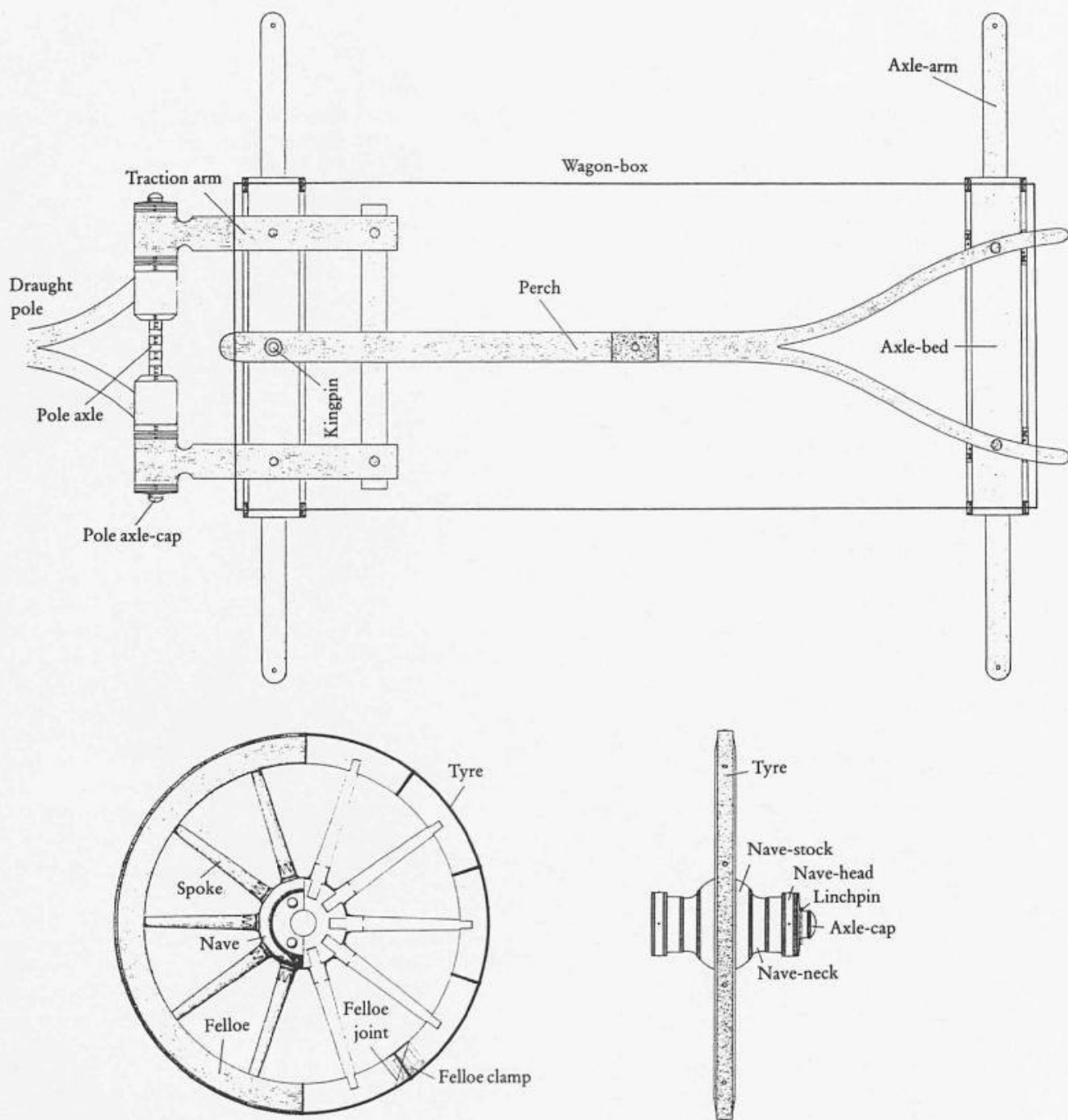


Fig. 1 Summary of wagon terminology (after Egg and France Lanord 1987).

CHAPTER 1

Introduction

The four-wheeled ceremonial wagon played a rôle of considerable importance in the Late Bronze and Early Iron Age Urnfield and Hallstatt periods – from the 13th to the 5th century BC. Apart from the detailed survey of wagons from Hallstatt period graves (Ch. 4–11), this study considers earlier wagon finds (Ch. 2–3) and evidence from a number of other sources of archaeological information, including horse-gear, pictorial representations and wagon models (Ch. 12). Sources of evidence for the use of ceremonial wagons are found in most parts of Europe; this rich flow of information, ranging from wagon-graves to depictions, models and later even including a few historical references, illustrates the importance of the tradition of four-wheeled ceremonial wagons in Europe.

A large part of this book is involved with a detailed treatment of Hallstatt period wagon-graves. In the area of study (Fig. 4) it was possible to collect a total of 228 wagon-graves which are described in full in the catalogue (since writing the catalogue, 14 more wagons have come to light, see Addenda, p. 345. Furthermore the characteristic wagon fittings have been illustrated on Pls 1–136. In the course of a number of museum tours the author studied and drew almost all the wagon finds (apart from the well-published finds from Switzerland and the Middle Rhine area) and, when possible, illustrated any unpublished associated grave goods. Although the catalogue and plates provide a complete coverage of wagon finds, two areas are exceptional. The important article by W. Drack (1958a) made it unnecessary once again to illustrate the Swiss finds in detail. Similarly, in the Middle Rhine area (Rheinland-Pfalz and Hessen) the wagon-graves are also mostly well published and have recently been listed and discussed by A. Haffner and H.-E. Joachim (1984). Naturally, the classificatory and interpretative parts of this study take full account of these two areas.

A complete list of wagon-graves from the area of study (Fig. 4) can be found at the end of this chapter. The locations of the graves are shown on a series of maps of France (Fig. 6), Switzerland (Fig. 7), the Middle Rhine area (Fig. 8), south-west Germany (Fig. 9), Bavaria (Fig. 10), Bohemia (Fig. 11) and Austria (Fig. 12). The locations of the detailed map sections and of the four sites not included on Figs 6–12 are shown on Fig. 5.

Some of the terms used for wagon components may be unfamiliar, and an explanatory illustration is shown on Fig. 1. Concerning the cultural and chronological terminology used here, the traditional nomenclature has been employed. The Late Bronze Age is divided into the early (Br D), older (Ha A1), middle (Ha A2), younger (Ha B1)

and late Urnfield period (Ha B3). Similarly the Early Iron Age corresponds to the Hallstatt period, which can be divided into an earlier (Ha C) and later part (Ha D).

1.1 PREVIOUS RESEARCH

The history of research on Hallstatt wagons begins in earnest with the excavation in 1789 of the 'Leberberg' tumulus near Esting in Upper Bavaria by L. Westenrieder (see cat. no. 131). Although Westenrieder did not realise he had found a wagon (like many early excavators he interpreted the iron tyres as the rims of wooden shields), his description of the finds and his plan of the excavated area of the tumulus (Fig. 197) were of exemplary quality and are of value even for modern research.

In the following decades wagon-graves were uncovered sporadically, mostly by chance, and were rarely carefully excavated. In 1860 L. Lindenschmit published the first survey of wagon finds, in which he was able to mention nine wagon-graves from Germany and five from Switzerland, mostly dating to the Hallstatt period (1860, 136ff.). Lindenschmit noted that most scholars in his day thought that the vehicles were Celtic chariots (see for example Jahn 1870, 15). However, he argued that the wagon finds did not necessarily derive from the Celts (a 'foreign, un-Germanic group'), because chariots enjoyed widespread use among the peoples of antiquity. Instead Lindenschmit pointed to the use of wagons in the burial rites and cult of Germanic tribes, although he was careful not to draw definite conclusions about the ethnic origin of the South German wagon-graves.

In the 1880s, J. von Föhr (1892, 23) listed nine wagon-graves in Württemberg and Hohenzollern, which he rightly dated to the Hallstatt period. The excavations of J. Naue in Uffing, where he uncovered three wagon-graves (Naue 1887a) were also of importance for a knowledge of wagons. Naue thought that the four-wheeled wagons were splendid conveyances belonging to tribal chiefs. It is interesting to note that he compared the nailing of the iron tyres of the wagon from tumulus 6 to that on Assyrian chariots. Strangely he reconstructed the wheel with a double felloe, as on Assyrian wheels, a construction which G. Kossack later demonstrated for certain wagons of Ha C (see Ch. 4.3.1; Naue 1887a, 148–9; pl. 39, 2).

The wagon-graves in France were discussed and listed by J. Déchelette (1913, 747ff.). He dated the four-wheeled wagons to Ha II, and noted that they existed alongside (and perhaps derived from) a strong tradition of wagon burial in Italy. Déchelette thought that the four-wheeled vehicles served mainly for parade purposes, but suggested

also that magistrates and high priests could have ridden on wagons with thrones, drawn by men rather than horses (1927, 236ff.). R. Forrer's treatment of the finds from Ohnenheim is of particular importance for the history of research on wagons (1921a). In his wagon reconstruction (Fig. 2), Forrer was influenced strongly by the wagons found at Dejbjerg in Denmark. Most importantly, he thought the Ohnenheim wagon, like those from Dejbjerg, bore a throne – an idea which was subsequently adopted by many other scholars. Forrer suggested that the wagon was the conveyance of a high-ranking druid, and dated the find to the 5th century BC. In 1930 E. Ghislanzoni published L. Perrone's reconstruction of the wagon from Como-Ca'Morta. The reconstruction once again included a sort of chair on the wagon-box, and Ghislanzoni thought the wagon was used for parades or other special functions (Fig. 3). In contrast, the four-wheeled wagon from the Regolini-Galassi grave from Cerveteri was reconstructed at the start of this century by G. Pinza, and L. Pareti (1947) thought that it was a mere funerary conveyance, specially made for the burial.

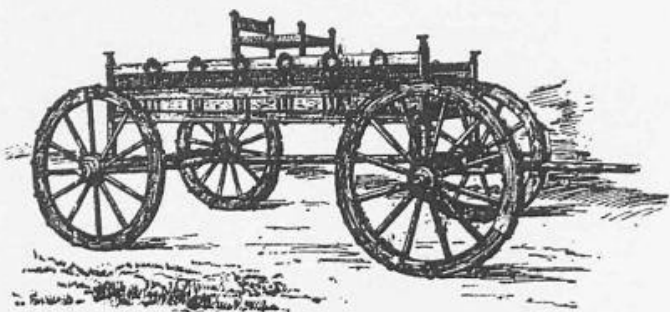


Fig. 2 R. Forrer's reconstruction of the wagon from Ohnenheim, Alsace (after Forrer 1921a).

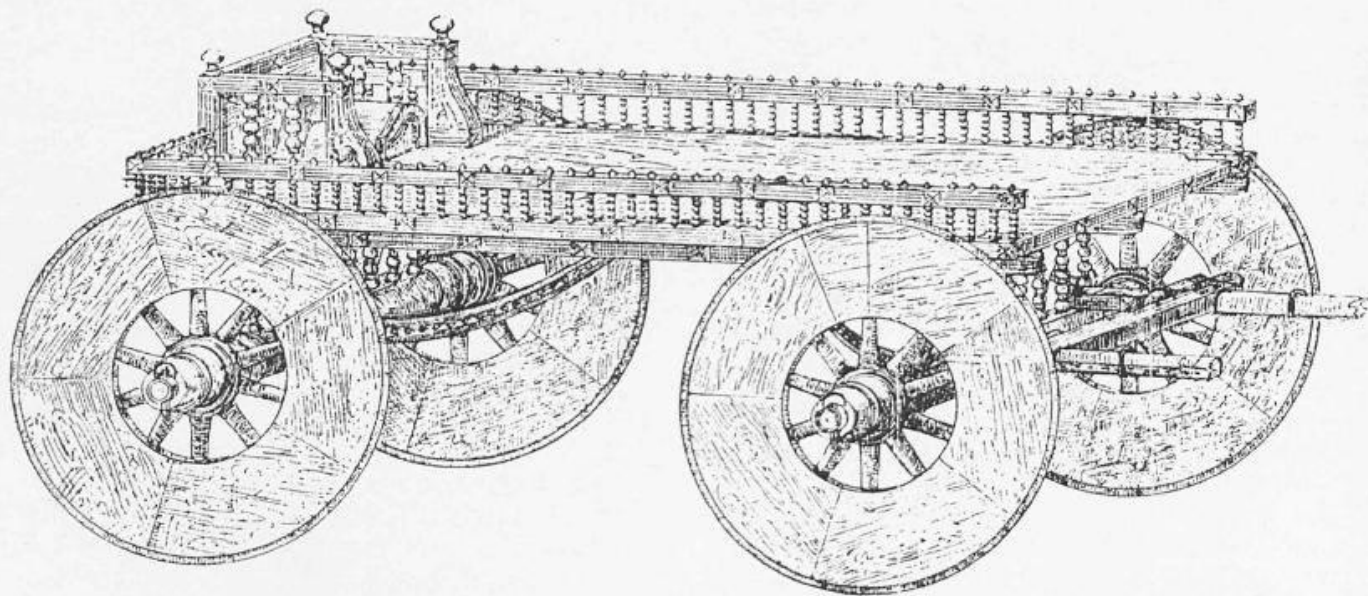


Fig. 3 L. Perrone's reconstruction of the wagon found in 1928 at Como-Ca' Morta, Lombardy (after Ghislanzoni 1930).

O. Paret's article on the princely grave from Bad Cannstatt opened a new chapter in the study of Hallstatt wagons (1935a). Paret was able to list more than 30 wagon-graves of the Hallstatt period in Baden-Württemberg, and also discussed finds from neighbouring areas. He paid special attention to the typology of the finds from Bad Cannstatt, and noted that the naves from Bad Cannstatt and Ludwigsburg were of the same type, perhaps made in the same workshop. The article contained a mass of detailed information about wagon construction, for example concerning wheel diameters, naves, wheel gauges etc. Paret agreed that some wagons probably bore thrones or chairs, and suggested that they were conveyances used for travelling.

The excavations of F. Dvořák in Bohemia brought to light a number of important wagon-graves, particularly in the cemetery of Hradenín. Dvořák was a careful excavator and published valuable, detailed information on his wagon finds (especially *ibid.* 1938b). He discussed the construction of the wagons in depth, and put forward reconstructions of two wagons (1938b, 7, fig. 1; 67, fig. 60); he suggested that the wagon from Hradenín grave 28 had a chair on the rear end of the box. He also noted that the rich, princely graves were provided with a complete wagon, while poorer graves only contained a few wagon fittings (e.g. linchpins) along with horse-gear. Both Dvořák (1938b, 92; 95f.) and J. Filip (1937, 41–2) argued that the practice of wagon burial was introduced from the 'Celtic' cultures of South Germany and East France, along with the inhumation rite, tumulus burial, and the provision in graves of joints of pig meat and fire-dogs ('*Mondidolen*'). C. Pescheck (1948, 173) came to a similar conclusion, seeing the diffusion of wagon burial to Bohemia from South Germany as part of a general spread of many elements of Hallstatt culture to Bohemia and the East Alpine area from the west.

In 1948 W. Rest published a detailed discussion and reconstruction of the four-wheeled wagon from Bell. This work is important for our knowledge of wagon construction, drawing attention to details such as the bent one-piece felloe and the shrink-fitting of the iron tyre. Rest, in contrast to O. Paret and R. Forrer argued for a reconstruction of the Hallstatt wagons with a pivoting front axle.

In 1956 S. Schiek presented his important doctoral thesis, which sadly remains unpublished (1956a). However, Schiek published many of his results in a number of articles. His list of the wagon-graves of the Hallstatt period and the chariot-graves of early La Tène date (1954, 163ff.) and his treatment of the finds from Hügelsheim (1981) are most important for our research. He noted two main types of naves, which he named type A (conical in shape) and B (cylindrical); he also reasserted H. Zürn's argument (1942) that the tyres with close-set nails with large rectangular heads (our type VC) can be dated to an early part of Ha D (1956a). Schiek's distribution map of wagon-graves, published in 1954 (1954, 159, fig. 5), was of great importance; he thought that the gradual geographical shift of wagon burial during the Hallstatt and early La Tène periods indicated movements of groups of people from the east to the west. Regarding the construction of the wagons, Schiek stressed that those of the Hallstatt period always seem to have had four wheels, and were lightly built and small in size. He concluded that they were not designed for the transport of goods, but as conveyances for a special social class. He suggested that the provision of a wagon in a grave was a sign of wealth, perhaps showing the dominant social position of the deceased.

The year 1958 saw the publication of the wagon-graves from Switzerland (Drack 1958a) and France (Joffroy 1958). W. Drack's study was hampered by the poor excavation and bad preservation of the Swiss finds; nevertheless his work was of considerable importance. Among other things Drack noted the existence of distinct types of nave: a biconical type with bronze sheet sheathing, a cylindrical type with ribbed iron sheathing, and a cylindrical type without iron sheathing but with nave-caps. R. Joffroy assembled a valuable body of information about French wagon-graves and offered some suggestions concerning the use of the wagons. He concluded that the wagons were not utilitarian, but were ritual, processional vehicles reserved for powerful chiefs or priests. Owing to the lack of horse-gear in most of the French graves, Joffroy suggested that they may have been drawn by people rather than horses – an idea which goes back to J. Déchelette. The publication of the 'Hohmichele' tumulus by G. Riek (Riek and Hundt 1962) prompted an interesting discussion of the wagon finds. Although the excavators found an iron 'kingpin' in the front axle of the wagon from grave VI, Riek argued that the front axle was not pivoted. He considered that the wagons were reserved for an upper 'princely' class, and was strongly influenced by his theory that the 'Hohmichele' wagon was covered with an elaborate canopy.

The publications of G. Kossack represent the most

important advances in the study of wagons and wagon burial (1954a; 1959; 1970; 1971). Kossack recognised that the conical nave type can be dated to the earlier part of Ha D, and added that the nave from Bubesheim was typical for Ha C. He also noted that naves with flat iron caps were not made before Ha D. Similarly he wrote that iron tyres with long nail heads (our type IA) are dated to Ha C whereas those with rectangular nail heads (our type VC) date to Ha D. Kossack was the first to make a detailed study of wheel felloes, and was able to demonstrate the so-called *Großeibstadt* construction. Kossack also studied horse-gear, and made the important discovery that the horse bits of the western Urnfield culture are relatively narrow (70–80 mm wide) compared to those of Ha C and the later Urnfield period in the Carpathian Basin (80–100 mm wide); he argued that the wider bits indicated the introduction of a larger race of horses, probably reaching the Carpathian Basin from the North Pontic steppes.

Kossack's most important contribution was his subtle discussion of the graves with wagons and horse-gear in Ha C: he argued that the distinctive burial rite in this phase, particularly characterised by rich horse-gear, should be understood and analysed as an expression of religious ideas. He described this rite in considerable depth and concluded that the Ha C wagon burial rite, as well as the early Urnfield rite, were both introduced to the area north of the Alps from the Middle Danube region. In fact, he came to the conclusion that not only the particular types of Ha C horse-gear but also a new race of horses and a new method of wagon construction (including the *Großeibstadt* felloe construction) were all introduced to Central Europe from the east.

Kossack thought that the wagons were used in important festive activities, involving processions, contests, libations and feasting, which were reflected in the burial rites of Ha C. He concluded that the idea which lay behind these rituals, documented both in the Hallstatt culture and in Etruscan Italy, was introduced as part of the so-called 'Thraco-Cimmerian' horizon from outside – originally being developed in the region between the South Russian steppes and the Near Eastern civilisations. During Ha C this burial rite expressed the social position of a special social group. In contrast, Kossack argued that in the rich graves of Ha D the social position of the deceased was instead expressed by the quantity and quality of the grave goods.

A number of other important contributions have been published in recent years. The treatment of Italian vehicles by E. Woytowitsch must be mentioned first (1978). In his study of the Hallstatt period in the Oberpfalz W. Torbrügge also discussed the wagon-graves from that area (1979). He believed that fragmentary wagons or wagon components were generally provided in graves in Ha C whereas later and further west (in Ha D) true wagon burial with complete wagons was practised. Like Kossack, Torbrügge noticed that horse-gear was regularly provided in graves in pairs and that horse-gear and wagons were generally reserved for male burials. L. Wamser offered an interesting discussion of the wagon-

graves in Franconia (1981a). Like Kossack, Wamser doubted the continuity of burial practices between the early Urnfield and Hallstatt periods, and saw the Hallstatt rite being introduced from the east. Wamser thought that at least some of the wagons would have been hard or impossible to steer, and concluded that they may have been simple funerary hearses, perhaps used in customs similar to the Greek *ekphora*. In 1982 U. Höckmann published the princely grave from Castel San Mariano. She questioned the idea of the 'Journey to the Beyond' on a wheeled vehicle, a concept often suggested by archaeologists to explain wagon burial or pictorial representations; in fact she doubted whether the idea of the 'Journey to the Beyond' on a wheeled vehicle ever existed in Greek or Etruscan thought.

In 1983 H. Hayen published his interpretation of the Dejbjerg wagon with a 'traction-arm construction', rendering it steerable; this type of design has since been noticed on a number of Hallstatt vehicles. In the same year S. Piggott's important survey of ancient wheeled transport was published. Piggott argued for a reconstruction of some Hallstatt wagons with pivoting front axles, and made a strong case for the indigenous development of the wagon through the Urnfield and Hallstatt periods in Central Europe. He called into question Kossack's eastern derivation of the Hallstatt wagon, and instead posited influences from Etruria, particularly in the case of the iron tyre, which was used on wagons now for the first time in Central Europe. Piggott saw the wagons being used in life, in ceremony or parades, and argued that the deposition of wagons in graves demonstrates their rôle as status symbols. The authoritative compilation and discussion of the vehicle-graves from the Middle Rhine area by A. Haffner and H.-E. Joachim in 1984 constitutes another milestone in the study of our subject.

Finally we should mention the interesting discussion of the use of four-wheeled wagons by P. Schauer (1987). Schauer sees both the early Urnfield as well as the Hallstatt wagons belonging to a single Bronze Age tradition centred in the Near East and the Mediterranean; among other cultural groups the tradition is represented in the Mycenaean culture, Geometric Greece and Etruscan Italy. According to Schauer the tradition involved the transport of the corpse in rituals which had a widespread currency.

1987 saw the exhibition entitled 'The Four-Wheeled Wagons of the Hallstatt Period' in the Römisch-Germanisches Zentralmuseum, Mainz. The exhibition included eight full-size reconstructions of four-wheeled wagons of the Early Iron Age: Großebstadt (H. P. Uenze 1987), Ohnenheim (M. Egg 1987a), the Býčí skála cave (F. E. Barth 1987), Hochdorf (J. Biel 1987), Vix (M. Egg and A. France-Lanord 1987), Bell (H.-E. Joachim 1987), Cerveteri 'Tomba Regolini-Galassi' (reconstruction by G. Pinza) and Como-Ca'Morta (reconstruction by L. Perone). The exhibition was able to display a number of important advances in our knowledge of Hallstatt wagons. Among other things M. Egg could show that R.

Forrer's reconstruction of the Ohnenheim wagon with a throne was incorrect; furthermore both H.-E. Joachim and M. Egg used the so-called 'traction-arm construction' in their wagon reconstructions, and argued that the vehicles had pivoting front axles. Egg and Joachim concluded that the wagons were complex, functioning vehicles which were doubtless used in life. Egg suggested that the wagons served as status symbols when they were provided in graves.

Our brief survey of previous research on Hallstatt wagons has touched on several points of difference in interpretation – not least concerning the start of wagon burial in the Hallstatt period. The sudden appearance of numerous wagon burials at the start of the Early Iron Age lends wagons and horse-gear an important rôle in any study of the origins of the Hallstatt culture. G. Kossack's work has been very influential in this respect: especially his derivation of characteristic elements of the early Hallstatt burial rites (including wagon burial) from the east, via the South Russian steppes and the Carpathian Basin. F. Holste's characterisation of the 'Thracio-Cimmerian' finds as a horizon resulting from a single historical event immediately preceding the start of the Hallstatt period also lead to an emphasis on events in the east in the interpretation of the start of the Hallstatt culture (Holste 1940). In clear contrast, S. Piggott's arguments for a local development of wagon use through the Urnfield and Hallstatt periods support an indigenous inception of the Hallstatt culture. And F. Dvořák's, J. Filip's and C. Pescheck's derivation of the Ha C wagon burial rite from the South German area also seems to speak for continuity from earlier Urnfield practices.

Although several distinct ideas about the function of the Hallstatt wagon have been put forward, every author has agreed on their high status in burial ritual. The different ideas about wagon use derive from historical or quasi-historical sources in ancient literature. For example, Lindenschmit's emphasis on a use in burial ritual and cult can be explained by his reference to Germanic sagas and myths. In contrast, the idea of the throne-bearing wagon reserved for a magistrate or high priest, suggested by J. Déchelette and R. Forrer, was clearly taken from Roman literature and depictions. References in the *Iliad* and *ekphora* depictions on Geometric pottery lead to the idea of the wagon as a funerary hearse, expressed for example by L. Pareti and L. Wamser. Finally, further pictorial depictions, especially those in Situla art, have reinforced arguments for the use of wagons in processions and festivals. Naturally, an interpretation of the use of the wagons is intimately related to their reconstruction. Thus authors such as G. Riek and L. Wamser doubted whether the wagons were steerable (having a fixed front axle) and put forward primarily a funerary function for the vehicles.

Our survey of wagon research raised a number of points of controversy. These are discussed in Ch. 9–12, and the results of our analysis are summarised in the concluding Ch. 13.

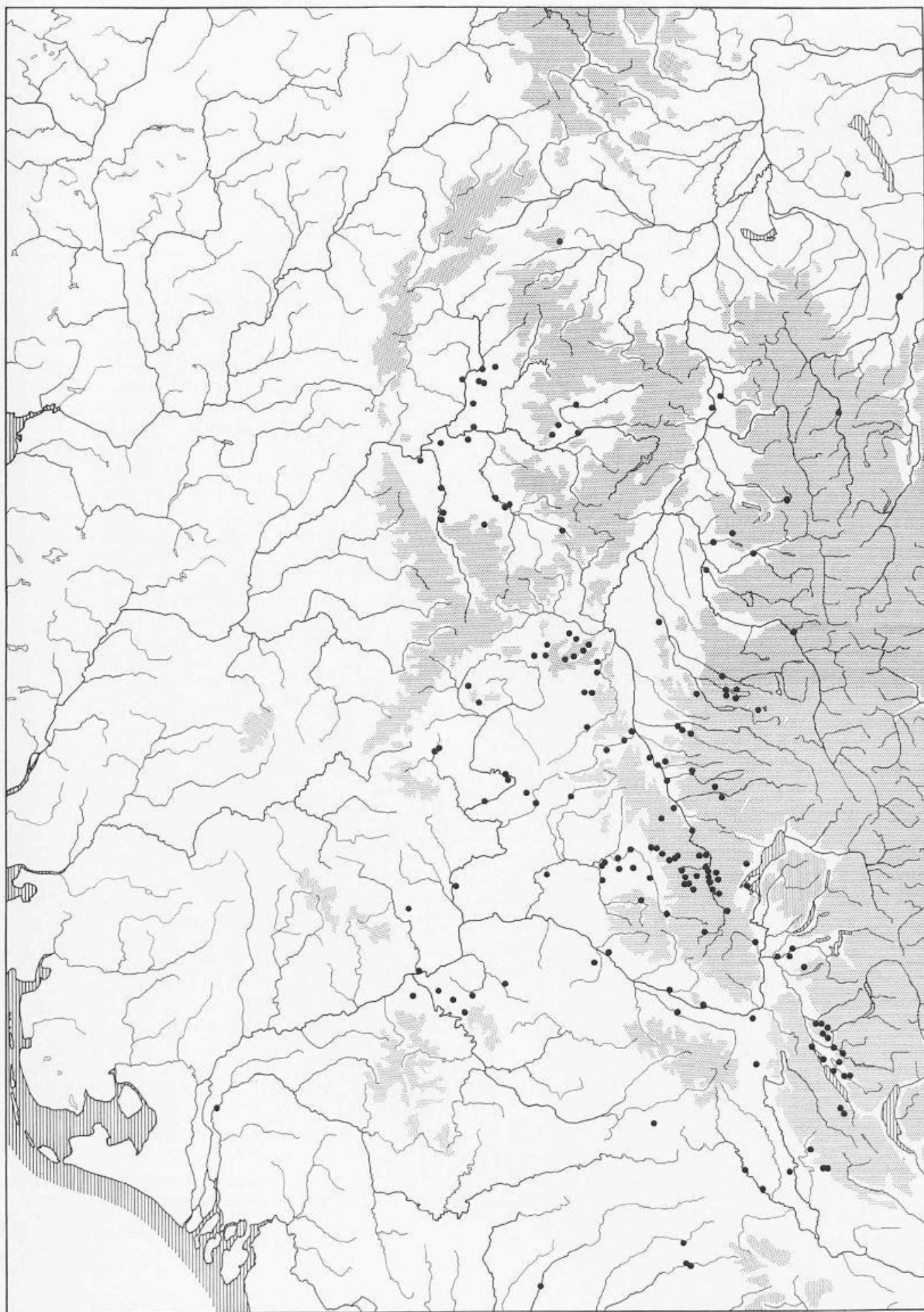


Fig. 4 The distribution of Early Iron Age wagon-graves, showing the graves included in the catalogue.

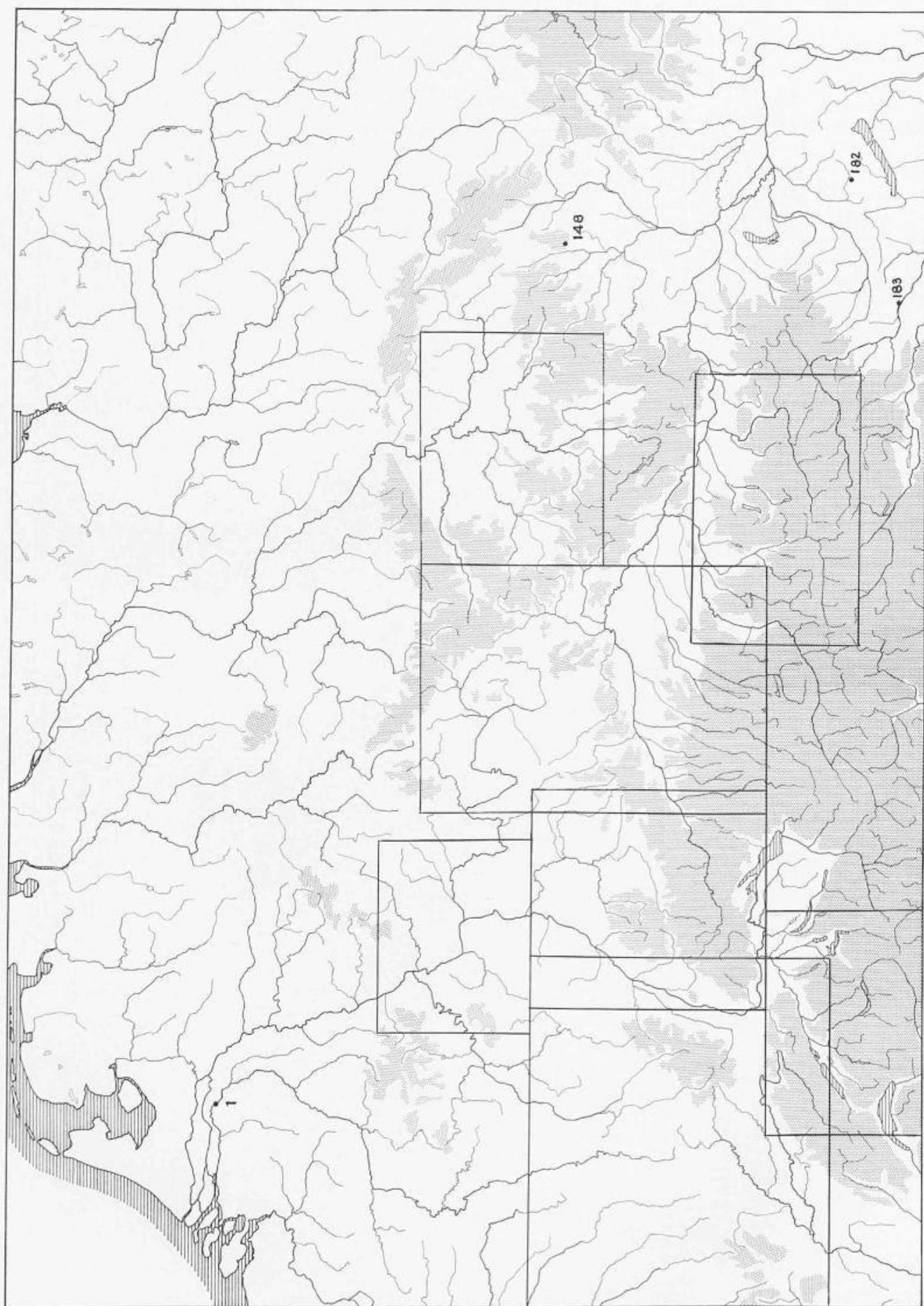


Fig. 5 The location of the wagon-graves, with the positions of the detailed map sections on Figs 6-12.

1.2 LIST AND LOCATIONS OF THE WAGON-GRAVES OF THE HALLSTATT PERIOD

1.2.1 *Holland* (Fig. 5)

1. Wijchen (Prov. Gelderland, Holland)

1.2.2 *France* (Fig. 6)

- 2A. Apremont, 'tumulus de la Motte', grave 1 (c. Gray, ar. Vesoul, dép. Haute-Saône)
- 2B. Apremont, 'tumulus de la Motte', grave 2 (c. Gray, ar. Vesoul, dép. Haute-Saône)
3. Blotzheim, 'Lisbühl' (c. Huningue, ar. Mulhouse, dép. Haut-Rhin)
4. 'Burgundy'
5. Chouilly, 'Les Jogasses', grave 16 (c. Épernay, ar. Épernay, dép. Marne)
6. Evans, 'Les Sarrasins' (c. Dampierre, ar. Dole, dép. Jura)
7. Forêt des Moidons/Chilly-sur-Salins, tumulus 2 (ar. Lons-le-Saunier, dép. Jura)
8. Grandvillars (ar. Belfort, Territoire-de-Belfort)
9. Hatten (c. Soultz-sous-Forêts, ar. Wissembourg, dép. Bas-Rhin)
10. Ivory, 'tumulus de Champ Peupin' (c. Salins-les-Bains, ar. Lons-le-Saunier, dép. Jura)
11. Marainville-sur-Madon (c. Charmes, ar. Épinal, dép. Vosges)
12. Ohnenheim (c. Merckolsheim, ar. Sélestat-Erstein, dép. Bas-Rhin)
- 13A. Sainte-Colombe, 'tumulus de la Butte' (c. Châtillon-sur-Seine, ar. Montbard, dép. Côte-d'Or)
- 13B. Sainte-Colombe, 'tumulus de la Garenne' (c. Châtillon-sur-Seine, ar. Montbard, dép. Côte-d'Or)
14. Saraz (c. Amancey, ar. Besançon, dép. Doubs)
15. Savoyeux, 'tumulus du Tremblois' (c. Dampierre-sur-Salon, ar. Vesoul, dép. Haute-Saône)
16. Veuxhautes-sur-Aube (c. Montigny-sur-Aube, ar. Montbard, dép. Côte-d'Or)
17. Vix (c. Châtillon-sur-Seine, ar. Montbard, dép. Côte-d'Or)

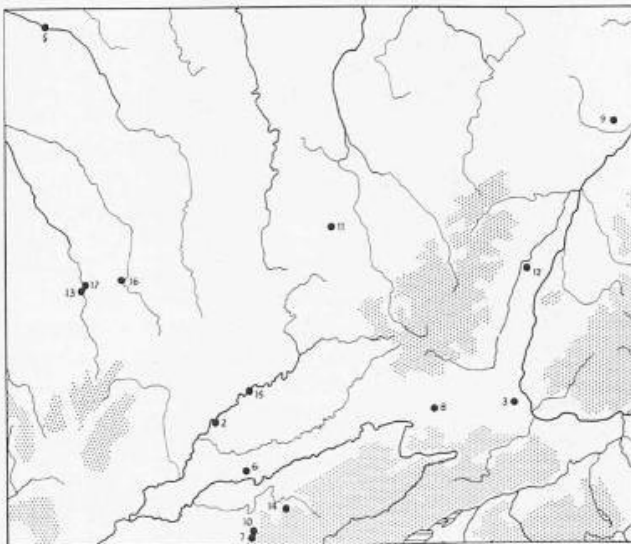


Fig. 6 The location of wagon-graves in France.

1.2.3 *Switzerland* (Fig. 7)

18. Adiswil (Gemeinde Gunzwil, Amt Sursee, Kanton Luzern)
19. Allenlütten (Gemeinde Mühleberg, Amt Laupen, Kanton Bern)
20. Birmenstorf (Bezirk Baden, Kanton Aargau)
21. Chabrey (Bezirk Avenches, Kanton Waadt)
22. Châtonnaye (Bezirk Glâne, Kanton Freiburg)
23. Cordast (Bezirk See, Kanton Freiburg)
24. Diemerswil (Amt Fraubrunnen, Kanton Bern)
25. Düringen (Bezirk Sense, Kanton Freiburg)
26. Fraubrunnen (Amt Fraubrunnen, Kanton Bern)
27. Grächwil (Gemeinde Meikirch, Amt Fraubrunnen, Kanton Bern)
28. Hermrigen (Amt Nidau, Kanton Bern)
- 29A. Ins, tumulus II of 1848 (Amt Erlach, Kanton Bern)
- 29B. Ins, tumulus VI of 1848, lower grave (Amt Erlach, Kanton Bern)
- 29C. Ins, tumulus VI of 1848, upper grave (Amt Erlach, Kanton Bern)
- 29D. Ins, tumulus VIII of 1848 (Amt Erlach, Kanton Bern)
- 29E. Ins, tumulus II of 1849 (Amt Erlach, Kanton Bern)
- 29F. Ins, tumulus IV of 1908 (Amt Erlach, Kanton Bern)
30. Jegenstorf (Amt Fraubrunnen, Kanton Bern)
31. Payerne (Bezirk Payerne, Kanton Waadt)
32. Rances (Bezirk Orbe, Kanton Waadt)
33. Unterlunkhofen (Bezirk Bremgarten, Kanton Aargau)
34. Urtenen (Amt Bern, Kanton Bern)
35. Vuiteboeuf (Bezirk Orbe, Kanton Orbe)
36. Wohlen (Bezirk Bremgarten, Kanton Aargau)

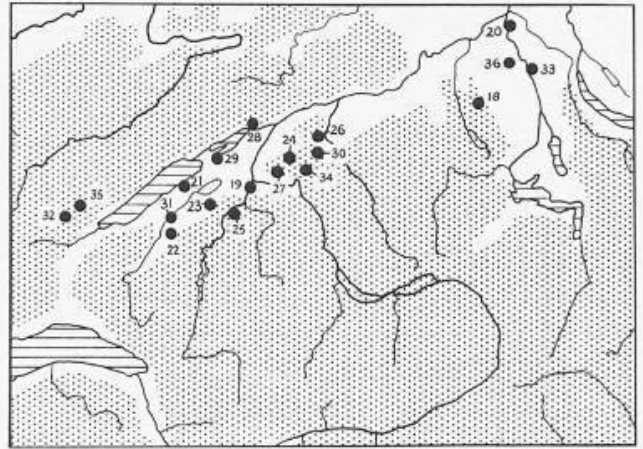


Fig. 7 The location of wagon-graves in Switzerland.

1.2.4 *Middle Rhine* (Fig. 8)

- 37A. Bassenheim, tumulus 8a of 1939, grave 1 (Kreis Koblenz, Reg.-Bez. Rheinland-Pfalz)
- 37B. Bassenheim, tumulus 3 of 1968 (Kreis Koblenz, Reg.-Bez. Rheinland-Pfalz)
- 37C. Bassenheim, tumulus 1 of 1969 (Kreis Koblenz, Reg.-Bez. Rheinland-Pfalz)
38. Bell (Kreis Simmern, Reg.-Bez. Rheinland-Pfalz)
39. Hennweiler, tumulus 1 (Kreis Kreuznach, Reg.-Bez. Rheinland-Pfalz)
- 40A. Hundheim, tumulus 1 (Kreis Bernkastel, Reg.-Bez. Rheinland-Pfalz)

- 40B. Hundheim, tumulus 2, grave 1 (Kreis Bernkastel, Reg.-Bez. Rheinland-Pfalz)
- 41. No grave allocated
- 42. Niederweiler (Kreis Zell, Reg.-Bez. Rheinland-Pfalz)
- 43. Oberlahnstein, tumulus 3, grave 2 (Loreleykreis, Reg.-Bez. Rheinland-Pfalz)
- 44. Weilerbach (Kreis Kaiserslautern, Reg.-Bez. Rheinland-Pfalz)
- 45. Offenbach – Rumpenheim (Offenbach a. Main, Reg.-Bez. Hessen)
- 46. Schwalbach, tumulus 1 (Kreis Wetzlar, Reg.-Bez. Hessen)

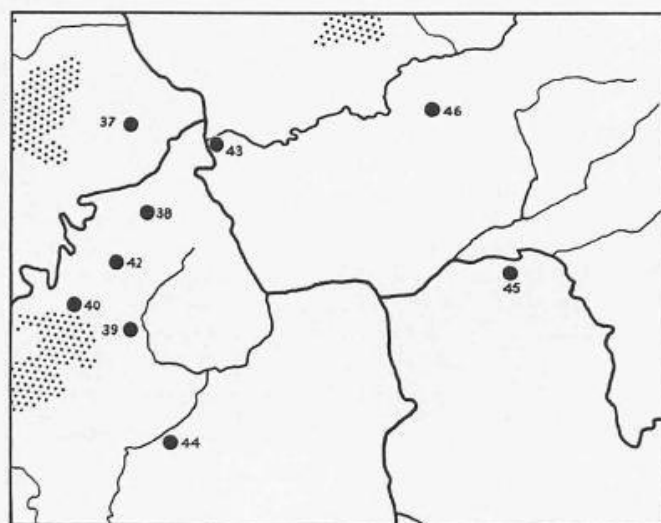


Fig. 8 The location of wagon-graves in the Middle Rhine area.

1.2.5 Baden-Württemberg (Fig. 9)

- 47. Aglasterhausen – Breitenbronn, tumulus in the 'Häldenwald' (Neckar-Odenwald-Kreis, Reg.-Bez. Karlsruhe)
- 48. Albstadt – Ebingen, tumulus I of 1932 (Zollernalbkreis, Reg.-Bez. Tübingen)
- 49. Albstadt – Truchtlengen, tumulus 11 (Zollernalbkreis, Reg.-Bez. Tübingen)
- 50. Altheim – Heiligkreuztal, tumulus 'im Wald Speckhau' (Kreis Biberach, Reg.-Bez. Tübingen)
- 51A. Altheim – Heiligkreuztal, 'Hohmichele', grave I (Kreis Biberach, Reg.-Bez. Tübingen)
- 51B. Altheim – Heiligkreuztal, 'Hohmichele', grave VI (Kreis Biberach, Reg.-Bez. Tübingen)
- 52. Asperg, 'Grafenbühl' (Kreis Ludwigsburg, Reg.-Bez. Stuttgart)
- 53. Bad Urach (Kreis Urach, Reg.-Bez. Tübingen)
- 54. Berghülen (Alb-Donau-Kreis, Reg.-Bez. Tübingen)
- 55. Bitz (Zollernalbkreis, Reg.-Bez. Tübingen)
- 56. Breisach am Rhein – Gündlingen, 'Zwölferbuck' (Kreis Breisgau-Hochschwarzwald, Reg.-Bez. Freiburg)
- 57A. Buchheim, tumulus cemetery near the 'Wolfegghof', tumulus of 1873 (Kreis Tuttlingen, Reg.-Bez. Freiburg)
- 57B. Buchheim, tumulus cemetery near the 'Wolfegghof', finds in Berlin (Kreis Tuttlingen, Reg.-Bez. Freiburg)
- 58. Burladingen – Gauselfingen, tumulus of 1853 (Zollernalbkreis, Reg.-Bez. Tübingen)
- 59. Eberdingen – Hochdorf an der Enz (Kreis Ludwigsburg, Reg.-Bez. Stuttgart)
- 60. Emerkingen (Alb-Donau-Kreis, Reg.-Bez. Tübingen)
- 61. Engstingen – Großengstingen (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 62. Erkenbrechtsweiler, tumulus X (Kreis Esslingen, Reg.-Bez. Stuttgart)
- 63. Filderstadt – Plattenhardt, 'im Weilerhau', tumulus 2 (Kreis Esslingen, Reg.-Bez. Stuttgart)
- 64A. Herbertingen – Hundersingen, 'im Waldteil Gießbübel', tumulus 1, secondary grave 1 (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 64B. Herbertingen – Hundersingen, 'im Waldteil Talhau', tumulus 4, central primary grave (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 65. Herbertingen – Hundersingen, 'Lehenbühl' (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 66A. Hohenstein – Oberstetten, tumulus 1 (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 66B. Hohenstein – Oberstetten, tumulus 2 (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 67. Hohenstein – Ödenwaldstetten (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 68. Hügelshelm, 'Heiligenbuck' (Kreis Rastatt, Reg.-Bez. Karlsruhe)
- 69. Igersheim – Simmringen, 'Bürzel' (Main-Tauber-Kreis, Reg.-Bez. Stuttgart)
- 70A. Immendingen – Mauenheim, tumulus M, grave 3 (Kreis Tuttlingen, Reg.-Bez. Freiburg)
- 70B. Immendingen – Mauenheim, tumulus N, grave 3 (Kreis Tuttlingen, Reg.-Bez. Freiburg)
- 71. Inzigkofen – Engelswies (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 72. Inzigkofen – Vilsingen (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 73. Jettingen – Oberjettingen, tumulus 3 (Kreis Böblingen, Reg.-Bez. Stuttgart)
- 74A. Kappel-Grafenhausen, tumulus 1 of 1880 (Ortenaukreis, Reg.-Bez. Freiburg)
- 74B. Kappel-Grafenhausen, tumulus 3 of 1976 (Ortenaukreis, Reg.-Bez. Freiburg)
- 75. Kirchberg an der Jagst – Lendsiedel, 'Fuchspörl' (Kreis Schwäbisch Hall, Reg.-Bez. Stuttgart)
- 76. Klettgau – Geißlingen, tumulus H (Kreis Waldshut, Reg.-Bez. Freiburg)
- 77. Köngen (Kreis Esslingen, Reg.-Bez. Stuttgart)
- 78. Ludwigsburg, 'Römerhügel', chamber grave 1 (Kreis Ludwigsburg, Reg.-Bez. Stuttgart)
- 79. Meßkirch – Langenhart, 'Haggenberg' (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 80. Meßkirch – Ringgenbach (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 81. Meßstetten – Hossingen, tumulus 1 of 1867 (Zollernalbkreis, Reg.-Bez. Tübingen)
- 82. Neuhausen ob Eck, 'Hexenwiesen' (Kreis Tuttlingen, Reg.-Bez. Freiburg)
- 83. Reichenau, tumulus B (Kreis Konstanz, Reg.-Bez. Freiburg)
- 84A. Salem, tumulus G (Bodenseckreis, Reg.-Bez. Tübingen)
- 84B. Salem, tumulus T (Bodenseckreis, Reg.-Bez. Tübingen)
- 85. Sankt Johann, tumulus of 1852 (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 86. Sankt Johann, tumulus of 1884 (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 87. Sankt Johann, tumulus of 1897 (Kreis Reutlingen, Reg.-Bez. Tübingen)
- 88. Sigmaringen (Kreis Sigmaringen, Reg.-Bez. Tübingen)
- 89. Sigmaringen – Laiz (Kreis Sigmaringen, Reg.-Bez. Tübingen)

90. Stuttgart – Bad Cannstatt, grave 1 (Kreis Stuttgart, Reg.-Bez. Stuttgart)
91. Stuttgart – Weilimdorf (Kreis Stuttgart, Reg.-Bez. Stuttgart)
92. Sulz am Neckar (Kreis Rottweil, Reg.-Bez. Freiburg)
- 93A. Tannheim, tumulus I (Kreis Biberach, Reg.-Bez. Tübingen)
- 93B. Tannheim, tumulus VI (Kreis Biberach, Reg.-Bez. Tübingen)
- 93C. Tannheim, tumulus VIII (Kreis Biberach, Reg.-Bez. Tübingen)
- 93D. Tannheim, tumulus XVI (Kreis Biberach, Reg.-Bez. Tübingen)
- 93E. Tannheim, tumulus XXI (Kreis Biberach, Reg.-Bez. Tübingen)
- 94A. Tübingen – Bebenhausen, tumulus of 1897 (Kreis Tübingen, Reg.-Bez. Tübingen)
- 94B. Tübingen – Bebenhausen, tumulus I of 1901 (Kreis Tübingen, Reg.-Bez. Tübingen)
95. Ulm – Eggingen (Kreis Ulm, Reg.-Bez. Tübingen)
96. Villingen-Schwenningen, 'Magdalenenberg', grave 1 (Schwarzwald-Baar-Kreis, Reg.-Bez. Freiburg)
97. Winterlingen, tumulus III (Zollernalbkreis, Reg.-Bez. Tübingen)
98. Unprovenanced (Württembergisches Landesmuseum, Stuttgart).

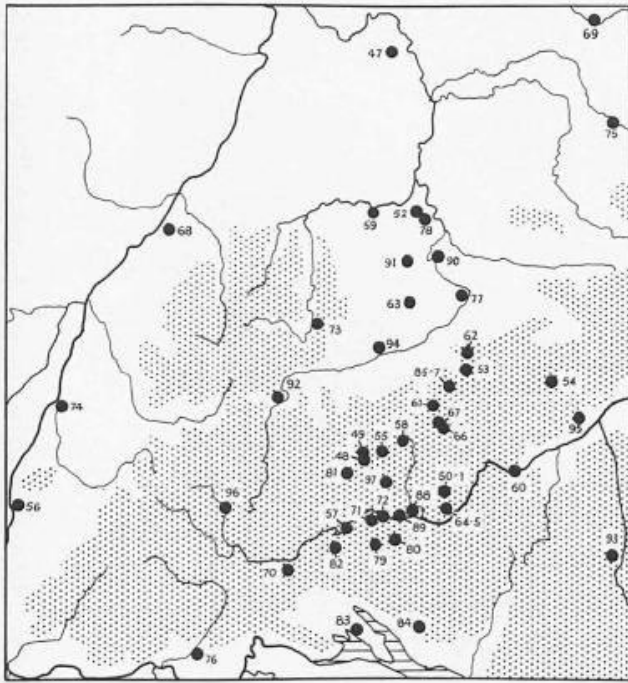


Fig. 9 The location of wagon-graves in Baden-Württemberg.

1.2.6 Bavaria (Fig. 10)

99. Aislingen, 'Oberes Ried', tumulus 1 (Kreis Dillingen a. d. Donau, Reg.-Bez. Schwaben)
100. Albertshofen, tumulus of 1936 (Kreis Kitzingen, Reg.-Bez. Unterfranken)
101. Altdorf (Kreis Landshut, Reg.-Bez. Niederbayern)
102. Augsburg – Kriegshaber, tumulus 1 (Kreis Augsburg, Reg.-Bez. Schwaben)
103. Augsburg – Wellenburg (Kreis Augsburg, Reg.-Bez. Schwaben)
104. Bad Königshofen i. Grabfeld – Merkershausen, tumulus of 1897 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)
105. Beilngries, 'Im Ried-Ost', grave 128 (Kreis Eichstätt, Reg.-Bez. Oberbayern)
- 106A. Beilngries, 'Im Ried-West', grave 73 (Kreis Eichstätt, Reg.-Bez. Oberbayern)
- 106B. Beilngries, 'Im Ried-West', grave 74 (Kreis Eichstätt, Reg.-Bez. Oberbayern)
- 106C. Beilngries, 'Im Ried-West', grave 89 (Kreis Eichstätt, Reg.-Bez. Oberbayern)
- 107A. No grave allocated
- 107B. Beratzhausen, grave 3 (Kreis Regensburg, Reg.-Bez. Oberpfalz)
108. Dietfurt a. d. Altmühl, 'Tennisplatz', grave 31 (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)
109. Dillingen a. d. Donau – Kicklingen, 'Mittleres Ried', tumulus 9 (Kreis Dillingen a. d. Donau, Reg.-Bez. Schwaben)
110. Dittenheim (Kreis Weißenburg-Gunzenhausen, Reg.-Bez. Mittelfranken)
111. Donauwörth, 'Riegelholz', tumulus 10 (Kreis Donau-Ries, Reg.-Bez. Schwaben)
- 112A. Ehingen a. Ries – Belzheim, 'Mähder', tumulus 104 (Kreis Donau-Ries, Reg.-Bez. Schwaben)
- 112B. Ehingen a. Ries – Belzheim, 'Mähder', tumulus 109 (Kreis Donau-Ries, Reg.-Bez. Schwaben)
113. Emmerting – Bruck, tumulus 2 (Kreis Altötting, Reg.-Bez. Oberbayern)
- 114A. Großebstadt, cemetery I, grave 1 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)
- 114B. Großebstadt, cemetery I, grave 4 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)
- 115A. Großebstadt, cemetery II, grave 2 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)
- 115B. Großebstadt, cemetery II, grave 4 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)
- 115C. Großebstadt, cemetery II, grave 14 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)
116. Haldenwang, finds from 1934 (Kreis Günzburg, Reg.-Bez. Schwaben)
117. Harburg – Marbach, tumulus 1 of 1973 (Kreis Donau-Ries, Reg.-Bez. Schwaben)
118. Hilpoltstein – Weinsfeld, 'Lohe', tumulus 4, grave 5 (Kreis Roth, Reg.-Bez. Mittelfranken)
119. Hohenfels, 'Haidensbuch', tumulus II (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)
120. Illschwang – Gehrsricht, tumulus 2 (Kreis Amberg-Weizsbach, Reg.-Bez. Oberpfalz)
- 121–2. No grave allocated
123. Kitzingen – Repperndorf (Kreis Kitzingen, Reg.-Bez. Unterfranken)
124. Leinach – Oberleinach (Kreis Würzburg, Reg.-Bez. Unterfranken)
125. Leipheim, 'Waldteil Justing-West', tumulus 14 (Kreis Günzburg, Reg.-Bez. Schwaben)
- 126A. Lupburg – Gottesberg, tumulus 1 (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)
- 126B. Lupburg – Gottesberg, tumulus 3 (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)
127. Münsing – Buchsee, tumulus 1 of 1907 (Kreis Bad Tölz-Wolfratshausen, Reg.-Bez. Oberbayern)
128. Nennslingen – Wengen, tumulus 1 (Kreis Weißenburg-Gunzenhausen, Reg.-Bez. Mittelfranken)

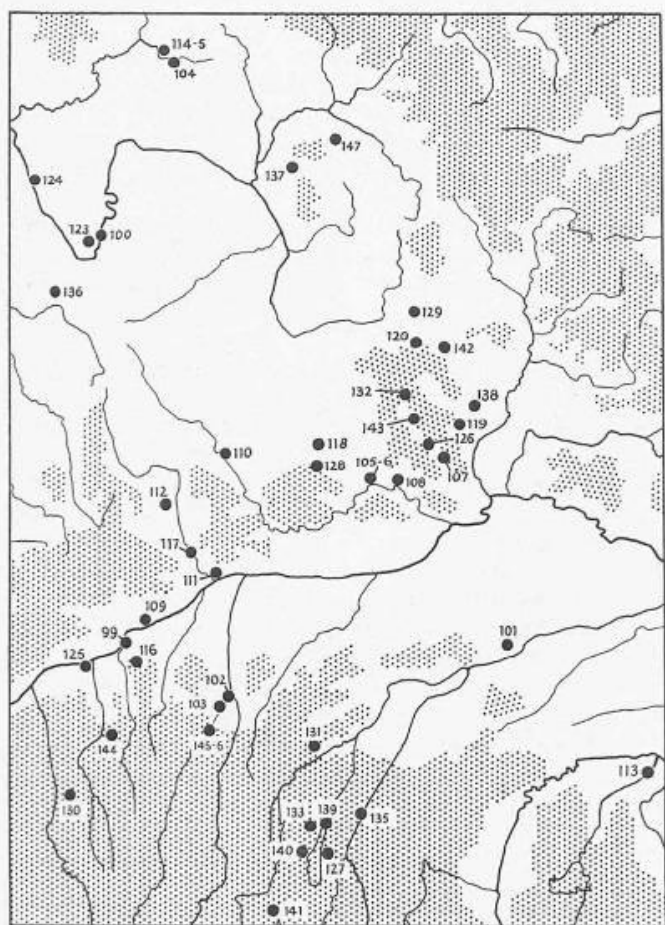


Fig. 10 The location of wagon-graves in Bavaria.

- 129. Neukirchen bei Sulzbach-Rosenberg – Gaisheim, tumulus 6 (Kreis Amberg-Sulzbach, Reg.-Bez. Oberpfalz)
- 130. Niederrieden, 'Lehbühel' (Kreis Unterallgäu, Reg.-Bez. Schwaben)
- 131. Olching – Neu-Esting, 'Leberberg' (Kreis Fürstenfeldbruck, Reg.-Bez. Oberbayern)
- 132. Pilsach – Niederhofen, tumulus 4 (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)
- 133. Pöcking – Aschering, tumulus 8 (Kreis Starnberg, Reg.-Bez. Oberbayern)
- 134. No grave allocated
- 135. Pullach i. Isartal, 'Gruppe Süd', tumulus 3 (Kreis München, Reg.-Bez. Oberbayern)
- 136. Riedenheim, 'Fuchsbühl' (Kreis Würzburg, Reg.-Bez. Unterfranken)
- 137. Schesslitz – Demmelsdorf (Kreis Bamberg, Reg.-Bez. Oberfranken)
- 138. Schmidmühlen – Markhof, tumulus of 1887 (Kreis Amberg-Sulzbach, Reg.-Bez. Oberpfalz)
- 139. Starnberg – Mühlthal, tumulus 1 of 1885 (Kreis Starnberg, Reg.-Bez. Oberbayern)
- 140. Tutzing – Traubing, 'Kirchlehel', tumulus 2 (Kreis Starnberg, Reg.-Bez. Oberbayern)
- 141A. Uffing a. Staffelsee, 'Willing', tumulus 1 (Kreis Garmisch-Partenkirchen, Reg.-Bez. Oberbayern)
- 141B. Uffing a. Staffelsee, 'Willing', tumulus 6 (Kreis Garmisch-Partenkirchen, Reg.-Bez. Oberbayern)
- 141C. Uffing a. Staffelsee, 'Willing', tumulus 11 (Kreis

- Garmisch-Partenkirchen, Reg.-Bez. Oberbayern)
- 142. Ursensollen – Erlheim, find of 1912 (Kreis Amberg-Sulzbach, Reg.-Bez. Oberpfalz)
- 143. Velburg – Lengenfeld, tumulus of 1870 (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)
- 144. Waltenhausen, 'Hairenbuch', tumulus III (Kreis Günzburg, Reg.-Bez. Schwaben)
- 145. Wehringen, 'Hexenbergle', tumulus 8 (Kreis Augsburg, Reg.-Bez. Schwaben)
- 146. Wehringen, 'Hungerbrunnenmähder', tumulus 1 (Kreis Augsburg, Reg.-Bez. Schwaben)
- 147A. Weismain – Görä, 'Flurabteilung Rangen', tumulus 1 (Kreis Lichtenfels, Reg.-Bez. Oberfranken)
- 147B. Weismain – Görä, 'Flurabteilung Rangen', tumulus 3 (Kreis Lichtenfels, Reg.-Bez. Oberfranken)

1.2.7 Czechoslovakia (Fig. 11)

- 148. Býčí-skála cave (Habrůvka parish, okr. Blansko, Moravia). For location see Fig. 5.
- 149. Dolany (okr. Plzeň-sever, Bohemia)
- 150. Dyšina, tumulus 2 (okr. Plzeň-sever, Bohemia)
- 151A. No grave allocated
- 151B. Hradenín, grave 5 (okr. Kolín, Bohemia)
- 151C. Hradenín, grave 18 (okr. Kolín, Bohemia)
- 151D. Hradenín, grave 24 (okr. Kolín, Bohemia)
- 151E. Hradenín, grave 28 (okr. Kolín, Bohemia)
- 151F. Hradenín, grave 30 (okr. Kolín, Bohemia)
- 151G. Hradenín, grave 33 (okr. Kolín, Bohemia)
- 151H. No grave allocated
- 151I. Hradenín, grave 46 (okr. Kolín, Bohemia)
- 151J. Hradenín, grave 58 (okr. Kolín, Bohemia)
- 152. Kladruhy (okr. Rokycany, Bohemia)
- 153. Lhotka (okr. Ústí n. L., Bohemia)
- 154. Manětín – Hrádek, grave 196 (okr. Plzeň-sever, Bohemia)
- 155. Miškovice (okr. Kolín, Bohemia)
- 156A. Nehvizdky, grave 1 (okr. Praha-východ, Bohemia)
- 156B. Nehvizdky, grave 2 (okr. Praha-východ, Bohemia)
- 157. Nymburk – Habeš (okr. Nymburk, Bohemia)
- 158. No grave allocated
- 159. Ohrada u Kolína (okr. Kolín, Bohemia)
- 160. Opařany, tumulus 2 (okr. Tábor, Bohemia)

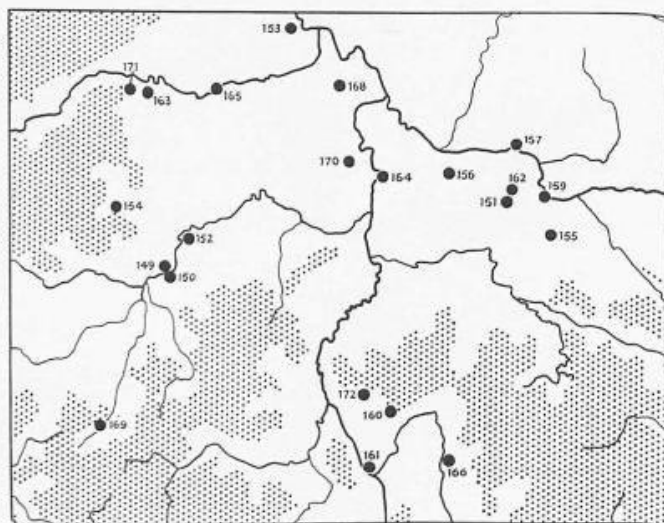


Fig. 11 The location of wagon-graves in Bohemia.

- 161. Pašovice (okr. České Budějovice, Bohemia)
- 162. Plaňany (okr. Kolín, Bohemia)
- 163. Poláky, grave 21 (okr. Chomutov, Bohemia)
- 164. Praha – Bubeneč, 'U modré růže', grave 3 of 1907 (Prague, Bohemia)
- 165. Rvenice, grave 1 of 1963 (okr. Louny, Bohemia)
- 166. Skalice (okr. Tábor, Bohemia)
- 167. No grave allocated
- 168A. Straškov-Račíněves, tumulus of 1911 (okr. Litoměřice, Bohemia)
- 168B. Straškov-Račíněves, tumulus of 1913 (okr. Litoměřice, Bohemia)
- 169. Švihov – Červené Poříčí (okr. Klatovy, Bohemia)
- 170. Tuchoměřice (okr. Praha-západ, Bohemia)
- 171A. Vikletice, grave 17 of 1965 (okr. Chomutov, Bohemia)
- 171B. Vikletice, grave 138 of 1963–4 (okr. Chomutov, Bohemia)
- 172. Zbislav – Zhoř (okr. Písek, Bohemia)

1.2.8 Austria (Fig. 12)

- 173. Amstetten (BH Amstetten, Niederösterreich)
- 174. 'Austria-Hungary'
- 175. Hallstatt, grave 507 (BH Gmunden, Oberösterreich)
- 176A. Helpfau – Uttendorf, tumulus 2 (BH Braunau am Inn, Oberösterreich)
- 176B. Helpfau – Uttendorf, tumulus 5 (BH Braunau am Inn, Oberösterreich)
- 177. Lengau, 'Galgenholz', tumulus 1 (BH Braunau am Inn, Oberösterreich)
- 178A. Mitterkirchen, tumulus II, grave 1 (BH Perg, Oberösterreich)

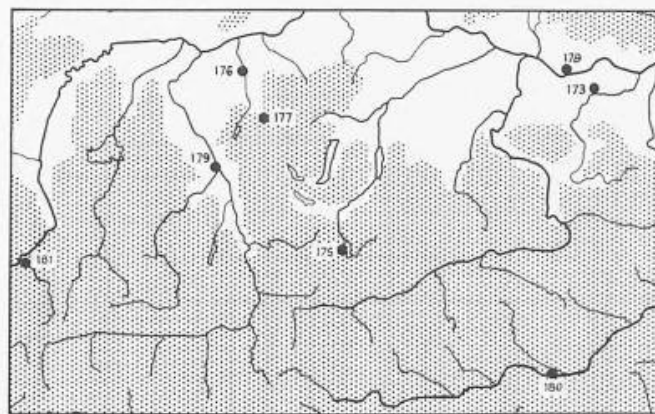


Fig. 12 The location of wagon-graves in Austria.

- 178B. Mitterkirchen, tumulus X, grave 1 (BH Perg, Oberösterreich)
- 179. Salzburg – Taxham (BH Salzburg Stadt, Salzburg)
- 180. Strettweg (BH Judenburg, Steiermark)
- 181. Wörgl, 'Egerndorfer Wald' (BH Kufstein, Tirol)

1.2.9 Hungary (Fig. 5)

- 182. Somlóvásárhely, tumulus I (Kom. Veszprém, Hungary).

1.2.10 Yugoslavia (Fig. 5)

- 183. Gornja Radgona (opština Gornja Radgona, Slovenia).

CHAPTER 2

The Bronze Age Prelude: the spread of the horse-drawn chariot

The exact origin of the horse-drawn chariot, introduced to Europe during the Bronze Age, remains obscure. However, certain considerations indicate that the new vehicle was developed in the Near East. The development of the horse-drawn chariot can presumably be explained by the necessity of greater speed and manoeuvrability in battle. But to achieve these advantages, considerable problems had to be overcome. Firstly a new, light type of vehicle was required, for which spoked wheels were essential. Secondly harness was needed in order to control and direct the team of horses. Thirdly the charioteers and

draught horses had to be well trained in order to be effective as a weapon: to realise the full potential of the chariot, the charioteers must have practised to fight together on the battlefield in units or chariot formations.

This presupposes the existence of a social group which had both the means and spare time to breed and break horses, and practise the art of charioteering. The high level of technology and social development required for the development of this elaborate weapon can only be expected at this time in the Near East.

In fact the first evidence for horse-drawn vehicles with spoked wheels does indeed come from the Near East, in the form of pictorial representations on cylinder seals and clay tablets from Assyrian colonies in Cappadocia, particularly Kültepe, which were made around 2000 BC or at the start of the 2nd millennium BC (Fig. 13; Littauer and Crouwel 1979, 68–71; figs 28–9; Amiet 1969, 2, figs 1–2). Horse harness is first found in the Near East in the form of a bit with wheel-shaped check-pieces from Tell el Ajul in Palestine, which can probably be dated to the 17th century BC (Fig. 14).

In any event, all the prerequisites were present (light vehicles with spoked wheels, horse teams, harness) when the full potential of the chariot in warfare was demonstrated, perhaps for the first time, by the conquests of the Mitanni. At the end of the 17th century the strategic value of the chariot was also exploited by the Amorites, Hittites and Hurrites, which doubtless aided the chariot's quick and widespread adoption (Hüttel 1977; 1982; Moorey 1986). In the early 16th century BC the chariot eventually reached Egypt, albeit at first only used by the invading Hyksos.¹ Soon the chariot was in use by the



Fig. 13 Seal impression from Asia Minor, now in the Metropolitan Museum of Modern Art, New York (after Littauer and Crouwel 1979).

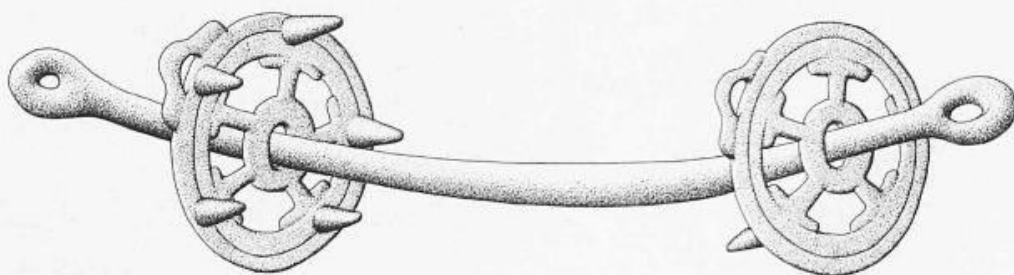


Fig. 14 Bronze horse bit from Tell el Ajul, Palestine (after Hüttel 1981a). — Scale 1:2.

¹ The earliest evidence for the chariot in Egypt is found on a stela of the pharaoh Kamose, which mentions the chariots of the Hyksos. Littauer and Crouwel 1985, 96.

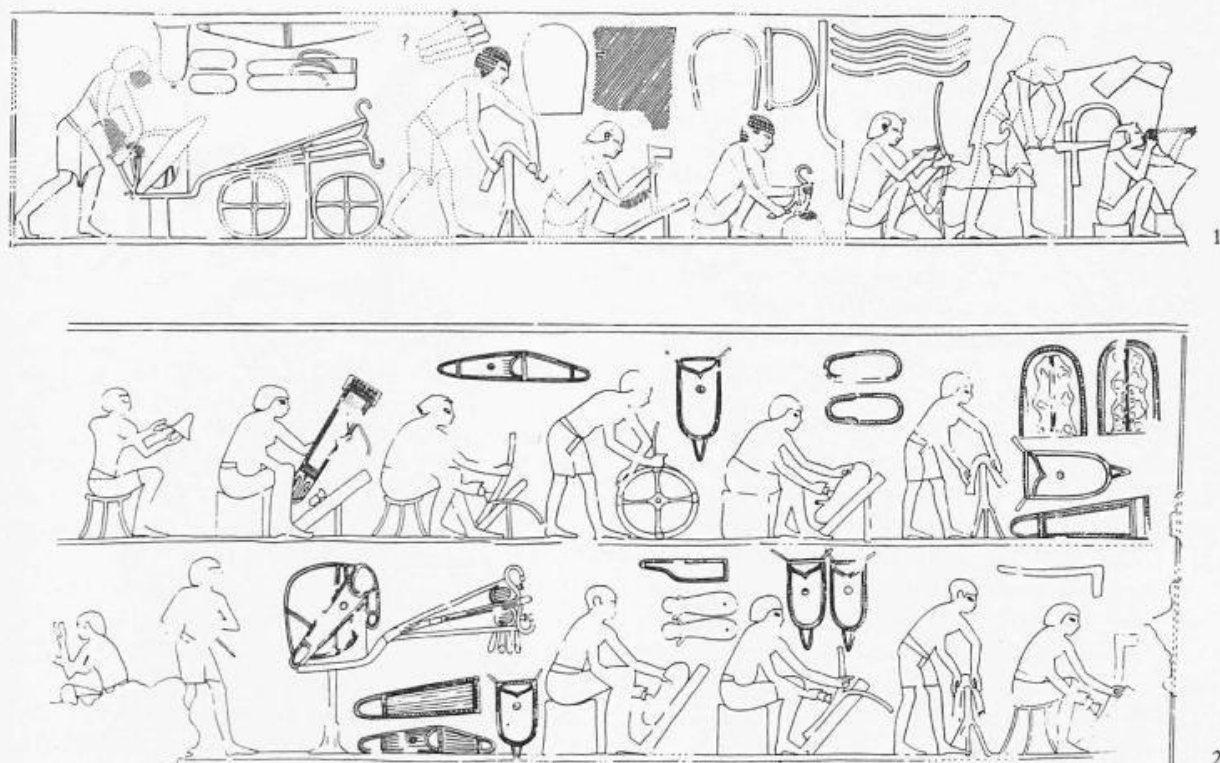


Fig. 15 Thebes, wall-painting from the graves of Puimrē (1) and Hepu (2) (after Littauer and Crouwel 1985).

Egyptians, and paintings from the tombs of officials in Thebes provide a lively picture of the workshops of the 15th century, in which the superb Egyptian chariots were made (Fig. 15).²

Perhaps it was precisely these events which accelerated the spread of the chariot to the north and west. The approximately contemporary appearance of the chariot in geographically and culturally so distant centres as Mycenae in the Aegean and Rymnikski in Siberia also suggests a common, Near Eastern origin. In grave-circle A in Mycenae chariots were depicted on seven stelae; furthermore grave IV contained four discoidal cheek-pieces and a signet-ring with a chariot representation (Crouwel 1981, pls 10; 35–39; 156). At Rymnikski, in the Chelyabinsk district (on the eastern edge of the Urals), 40 tumulus graves were excavated, five of which were provided with two-wheeled chariots (Piggott 1975; Gening 1977). In each of the five graves a pair of small oval pits had been excavated for the wheels, in which traces of the felloes and spokes could be detected, indicating a wheel diameter of 0.9–1.0 m (Fig. 16). Among the finds from the cemetery were numerous discoidal bone cheek-pieces: some graves were provided with as many as seven horses. According to the chronological arguments of H.-G. Hüttel, the finds should probably be dated before or in an early phase of the Seyma Culture (i.e. early within the Timber Grave/Andronovo culture), and should be

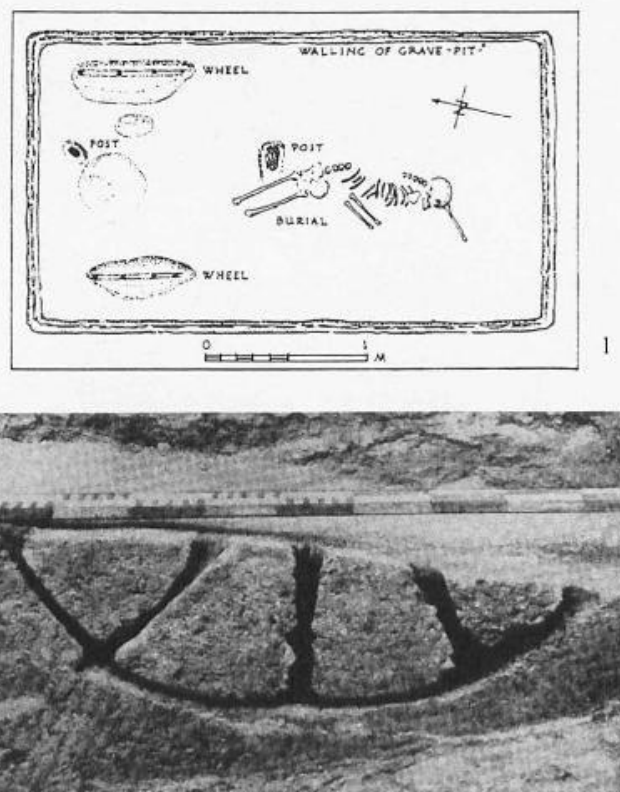


Fig. 16 Rymnikski, Chelyabinsk region, tumulus 28: plan of the chariot-grave (1 after Piggott 1983; 2 after Gening 1977).

² According to M. Wegner the scenes illustrated here date to the reigns of Thutmose IIIrd (1479–1447) and IVth (1420–1412): Wegner 1933.

equated approximately with Early Danubian III/Middle Danubian I in the Carpathian Basin (1981a, 28–32).

The early spread of the chariot to Europe is less easy to detect. Depictions on pottery vessels, which probably represent chariots, are known from a Kurgan at Saratov in the Volga region (Fig. 17, 1) and from Vel'ké Raškovce in Slovakia (Fig. 17, 2) (Galkin 1977; Vizdal 1972). The vessel from Saratov belongs to the Pokrovsk phase of the Timber Grave culture (approximately Middle Danubian I–III), and that from Vel'ké Raškovce can be assigned to the developed Piliny culture (Middle Danubian II–III). A stone slab from Kivik bears a definite chariot depiction (Fig. 18), but now with a rather unclear chronological position.

We have no other secure evidence for chariots in Central Europe before the Urnfield period. Instead elements appear in the Bronze Age which in the Near East were used together with chariots and were probably developed precisely for this purpose. Important are the spoked wheels, obligatory for the fast, light chariot, and the novel Near Eastern horse harness with spiked discoidal or oblong cheek-pieces, which allowed the chariot team to be precisely controlled. Both elements, spoked wheels and cheek-pieces, are also found in connection with chariots in Mycenae and Rymnikski.

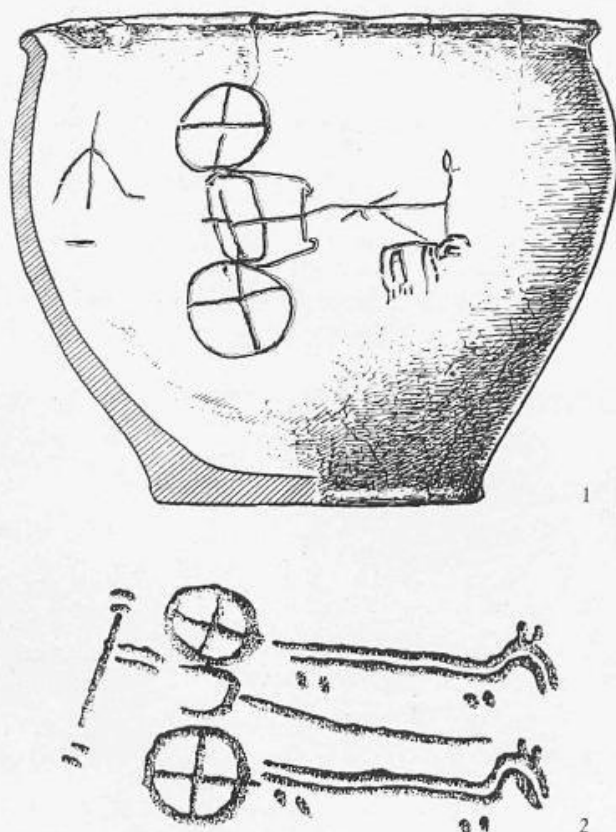


Fig. 17 Representations of two-wheeled vehicles: 1 from Saratov, Volga region, 2 from Vel'ké Raškovce, Slovakia (1 after Galkin 1977; 2 after Crouwel 1981). – Scale 1 1:2, 2 not to scale.

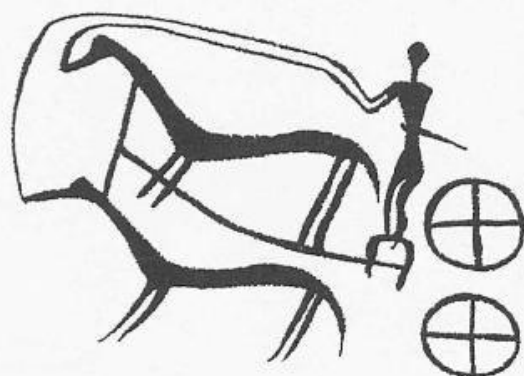


Fig. 18 Chariot representation on a stone slab from the grave of Kivik, Skåne (after Crouwel 1981).

2.1 SPOKED WHEELS

The first evidence for the spoked wheel in Central Europe is furnished by small pottery wheel models which are especially frequent in the Carpathian Basin from Early Danubian III onwards (Fig. 19; Tihelka 1954; Bóna 1960; *ibid.* 1975, map 10). Further to the west spoked wheels appear slightly later, for example in Scandinavia. The model with small spoked bronze wheels from Trundholm, Denmark, representing a sun-disc drawn by a horse, and the fragments of a wheeled model from Hälsingborg, Skåne, which was probably of a similar type, are dated to Period IIbc (Aner and Kersten 1976, 63f; pls 138–40; Sprockhoff 1936, pl. 1). The bronze wheel from the rich Danish tumulus grave of Tobøl is roughly contemporary (Fig. 20; Thrane 1962; Aner and Kersten 1986, 64–6; pls 40–41). Owing to the unknown stratigraphical context of the spoked wheel from Barche di Solferino, a settlement of the Polada culture, a pre-Urnfield date cannot be regarded as certain (Woytowitsch 1978, no. 4).

The dating of the North Italian and Scandinavian rock carvings depicting vehicles with two spoked wheels is even more problematical (Woytowitsch 1978, nos 264; 265; 274; Piggott 1983, 116–9). Dating evidence is sadly almost completely lacking. However, E. Anati brought examples from Valcamonica and Monte Bego into connection with Mycenaean influences of the 16th century BC (Anati 1960, 63). As for the Scandinavian rock carvings, their dating should probably be related to the chronological position of the chariot depiction from the Kivik grave (Fig. 18). The best indication of the date of this grave is provided by the axe depictions on the lost stone slab from the grave chamber (Schauer 1985, 137, fig. 11) which, according to comparable axes from Båstad, Gammelgarn, Skogstorp and Brøndsted Skov, suggest a position in Period II, although a secure dating remains impossible (Schauer 1985, 138, fig. 12, 1–3; 140, fig. 13, 2; for later, less exact parallels see Halbert 1955, 220–2).

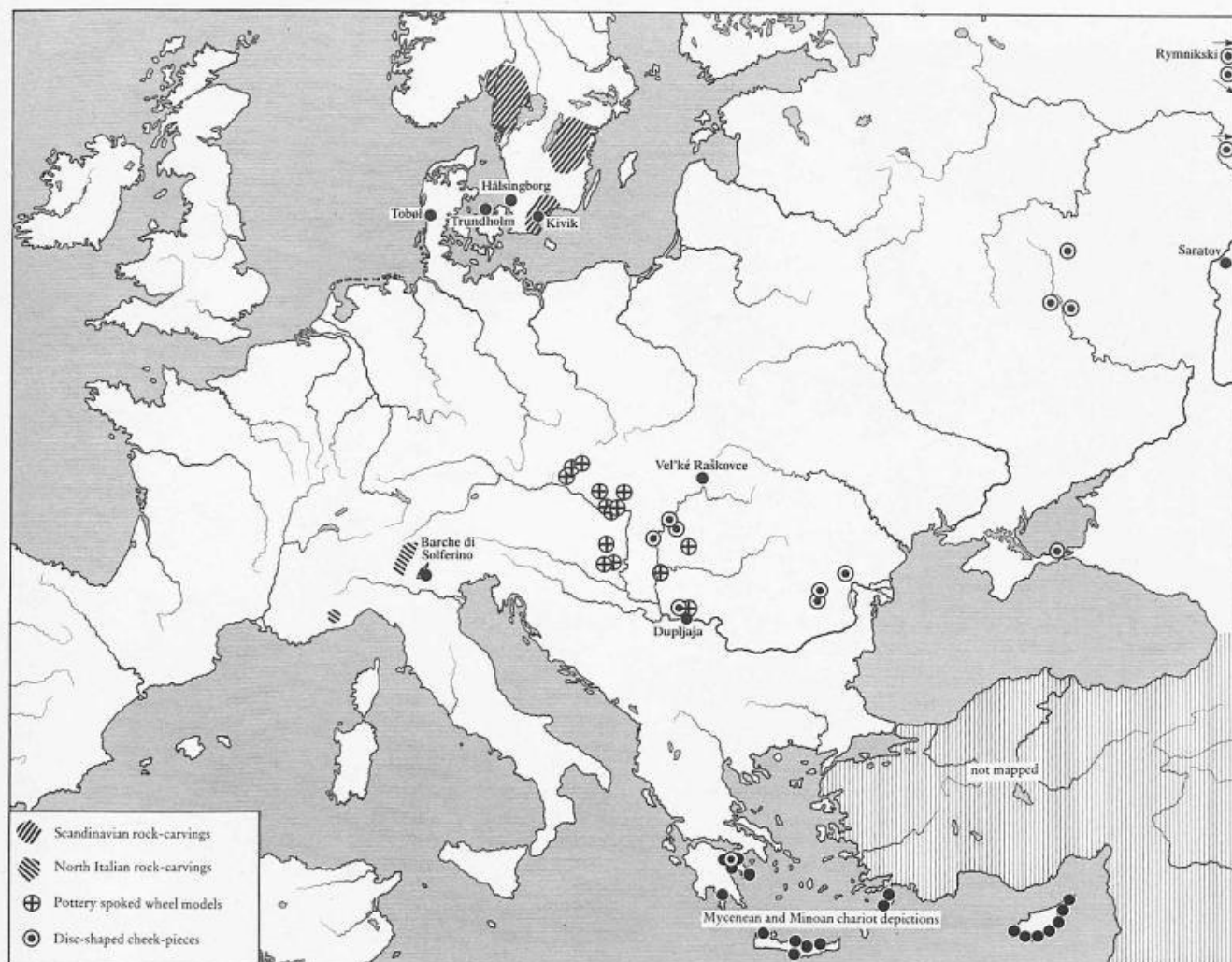


Fig. 19 Finds indicating the probable spread of the chariot in the older and middle Bronze Ages (pottery spoked wheels after Bóna 1975; discoidal cheek-pieces after Hüttel 1981a).

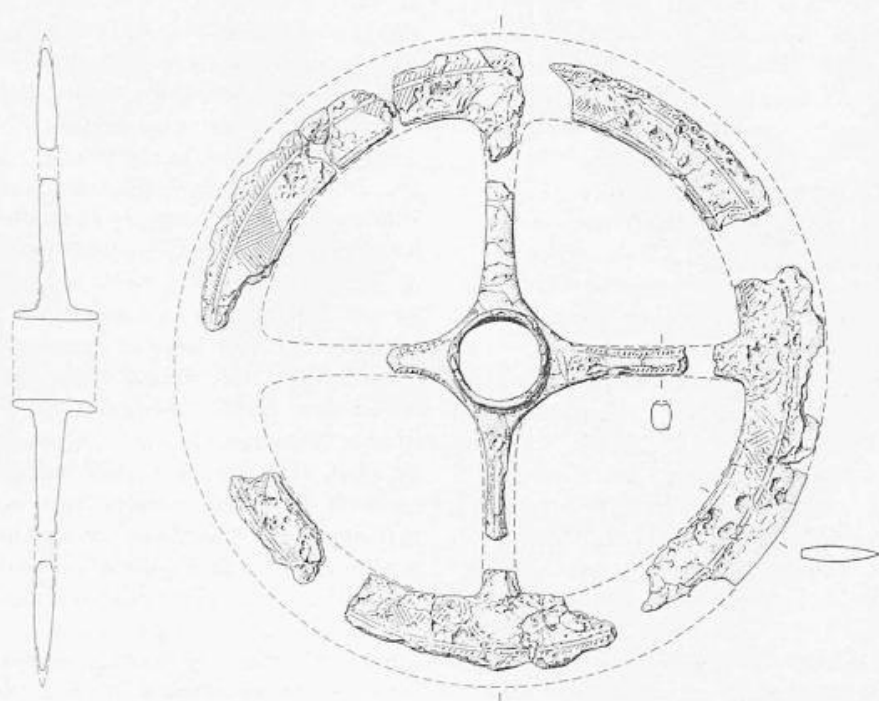


Fig. 20 Bronze model wheel from Tobol, Ksp. Fovling, Denmark (after Aner and Kersten 1986). – Scale ca. 1:2.

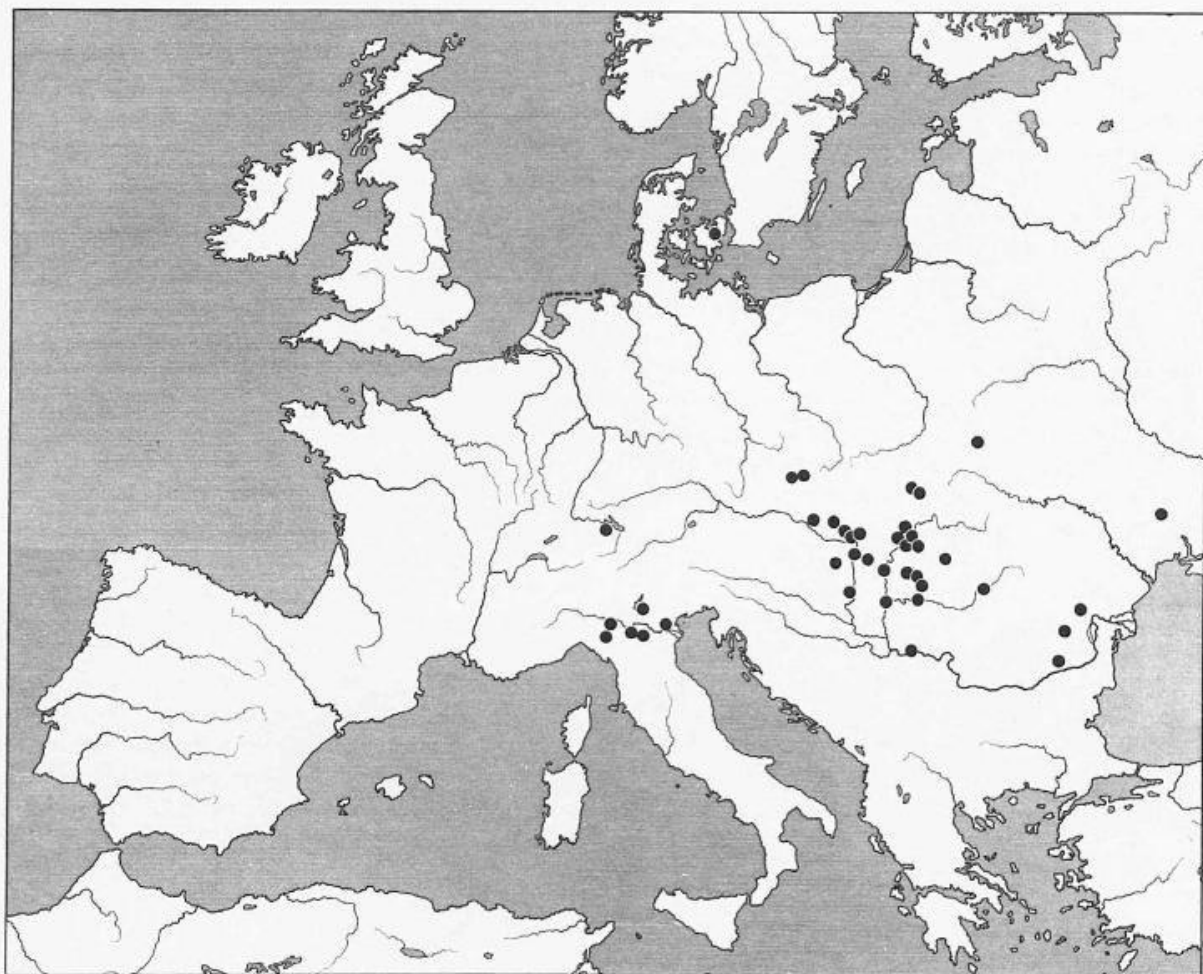


Fig. 21 The distribution of rod-shaped cheek-pieces of the older and middle Bronze Age (after Hüttel 1981a and Woytowitsch 1978).

2.2 HORSE HARNESS

The second element which was definitely used with the chariot, both in the Near East and in Mycenae and Rymnikski, was the spiked cheek-piece. These cheek-pieces appeared in the Carpathian Basin in Early Danubian III and at approximately the same time in Eastern Europe (Fig. 19; Hüttel 1981a, pl. 26A). Although now made of bone or antler, these discoidal or oblong cheek-pieces correspond closely to the early Near Eastern bronze examples (types I and II according to Potratz 1966, 102ff.). A connection between the Central European and Near Eastern cheek-pieces is irrefutable. Nevertheless the precise nature of the connection is unclear, although close parallels with Mycenaean cheek-pieces suggest the agency of the Aegean in transmitting the new harness to Central Europe.

In contrast to the new discoidal and oblong cheek-pieces, rod-shaped cheek-pieces seem to represent an older European tradition (Fig. 21; Hüttel 1981a, 'Stangenknebel'). Predecessors are probably to be sought among the elusive pre-Bronze Age rod-shaped cheek-pieces, for

example the fragmentary examples from the settlement of the Sredny-Stog culture at Dereivka in the Ukraine (Telegin 1986, 16, fig. 12, 6; 25, fig. 18, 11; 83, fig. 51; see also Hüttel 1981a, 16–23). In contrast to the discoidal and oblong examples, the early rod-shaped cheek-pieces were probably used on ridden horses, presumably in connection with a pastoral economy, for controlling and herding livestock. The horse burial from Gleina, Kreis Nebra, can also be judged as a riding horse; the horse was buried along with two cheek-pieces made from boars' tusks. Judging from the grave's position in a small cemetery, and its stone covering which was also typical for the surrounding graves, the horse-burial should, like the other graves of the cemetery, be dated to the Únětice Culture (Schulz 1932, 1–8; Hüttel 1981a, 18, fig. 2, 1).

Whether the rod-shaped cheek-pieces of the Middle Bronze Age were still used for harnessing ridden horses is an open question. However considering the similarity between the distributions of the rod-shaped cheek-pieces, of the spiked discoidal and oblong cheek-pieces, and of the evidence for spoked wheels, an employment on chariot horses cannot be ruled out³ (compare Figs 19 and 21).

³ Only one rod-shaped cheek-piece is known from the north-alpine area at this time, from Waldis, Canton Thurgau (Hüttel 1981a, no. 75A). Evidence for chariots is equally scant there. The only object which can be mentioned is the pottery disc with a spoked wheel depiction from Großengstingen, 'Haid', Kreis Reutlingen which, however, cannot be securely dated (Rieth 1938, 64, fig. 24).

2.3 CONCLUSIONS

The contemporary appearance in Central and Eastern Europe of novel (discoidal and oblong) cheek-pieces and evidence for spoked wheels was presumably connected with the spread of the chariot. However, it is much less certain whether the distribution of the cheek-pieces and spoked wheels necessarily indicates a widespread use of the chariot in the Central European Middle Bronze Age. The transmission of the chariot to Central Europe along with other elements of Aegean influence, particularly strong in the 16th century BC, does not seem improbable (Müller-Karpe 1977; Hüttel 1977). A secondary communication of these foreign influences from the Carpathian Basin, for example to Scandinavia and North Italy, is more difficult to demonstrate, particularly in the case of the chariots, but cannot be dismissed.

Owing to our rather scant knowledge it is difficult to draw firm conclusions about the function of the early chariots in Central Europe. Judging from their predecessors in the Aegean and the Near East, the chariot was probably communicated as an object of display or even as a status symbol of a dominant, doubtless warlike social group. Perhaps the depictions from Kivik and Vel'ké Raškovce can be interpreted in this sense.

It is not certain whether these chariots also had a rôle in cult. In the case of Trundholm it was the horse and sun-disc which together formed the symbolic or mythological

content of the object; the six wheels simply made the model mobile and probably had no essential importance. On the other hand the wheel model from Tobøl (Fig. 20), with its sharp felloe, could not have had a practical function and therefore presumably had a symbolic and perhaps cultic value of its own. It is impossible to identify the function of the pottery wheel models, which are so numerous in the Carpathian Basin; and the meaning of the numerous simple wheel-shaped symbols (circle with cross: for example representing a wheel, a sun-disc or simply a decorative motif) is equally unknown, although their common occurrence in the Middle Bronze Age has by some authors been explained by the introduction of the spoked wheel along with Aegean influence of the Shaft Grave period (e.g. Kubach 1971). The wheeled model from Dupljaja is of great importance for these questions, and its chronological and cultural position will be discussed in detail below (Ch. 12.1).

The evidence suggests that the chariot did not gain widespread acceptance in Bronze Age Europe. Certainly the level of social development in Central and Northern Europe does not seem sufficient to have supported the use of chariots in war, or even the emergence of a chariot-driving aristocracy. Instead the exotic wheeled conveyances may have been more suited to the realms of cult and mythology and perhaps the long tradition of ceremonial wagons in Central Europe should be traced back to roots in the Bronze Age.

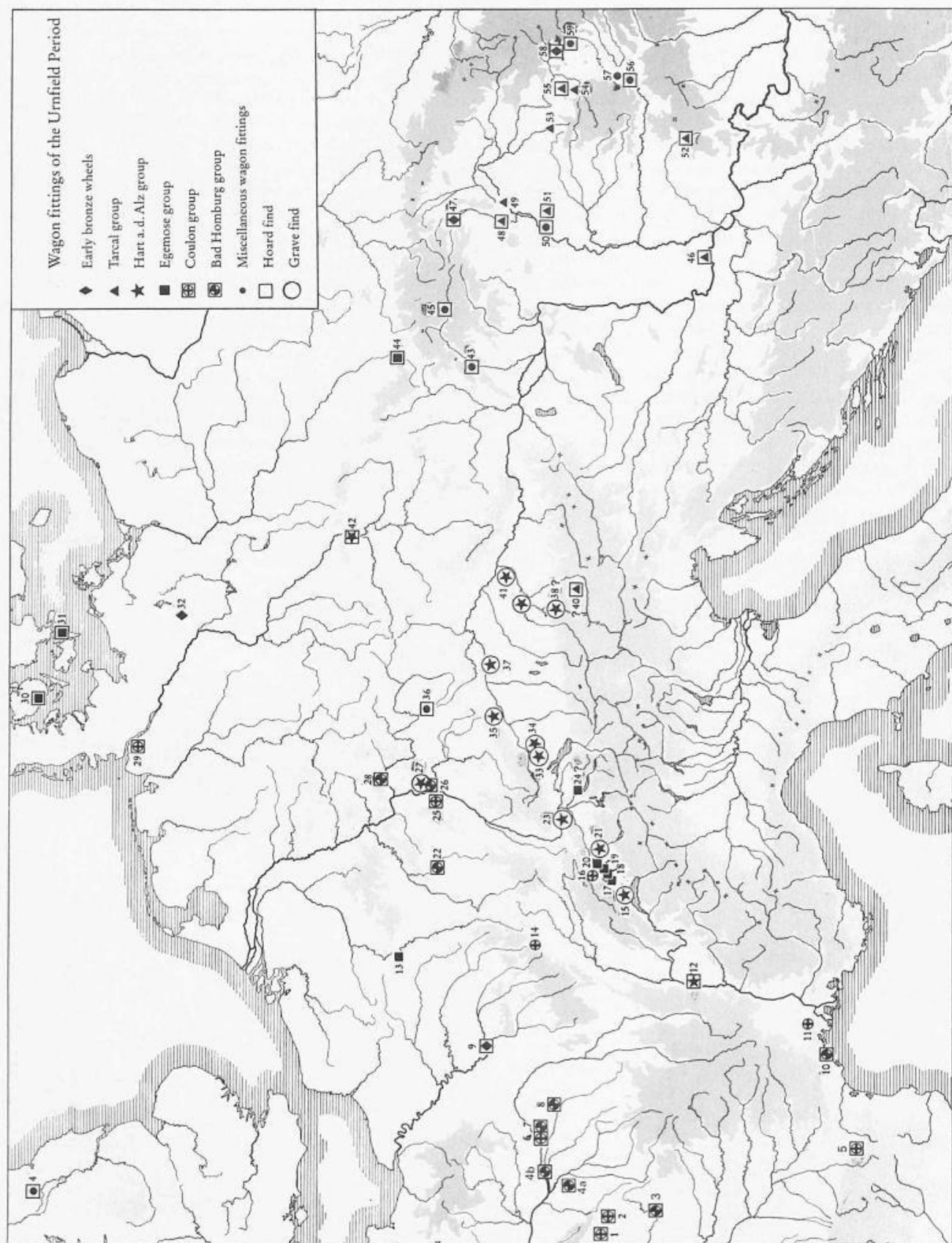


Fig. 22 The distribution of the wagon fittings of the Urnfield period. The numbers are referred to in Ch. 3, lists 1-7.

CHAPTER 3

The Ceremonial Wagons of the Urnfield Period

The wagon finds of the Urnfield period have been divided here into six typological groups and are collected in a series of lists. The finds include bronze objects from as many as 65 find locations, revealing a tradition of wagon construction covering the whole Urnfield period (Fig. 22; a schematic representation of the chronological development of Urnfield wagons is shown on Fig. 107). This chapter is limited chiefly to discussion of the six typological groups of wagon fittings. It has sometimes been necessary to consider in detail exactly which objects can be accepted as wagon fittings – particularly in the case of the Hart a. d. Alz, Egemose and Bad Homburg groups, in which the original function of many of the bronze furnishings is not immediately obvious.

The circumstances of deposition of many Urnfield wagon fittings, often as hoards or single objects, impede our efforts of interpretation, but at the same time offer insights which are not available in the preceding and following periods. These matters are treated below, where both grave and hoard finds are discussed (Ch. 12.1–2).

3.1 EARLY BRONZE WHEELS

Early bronze wheels, or fragments of such wheels, are known from four European locations (Fig. 22).

- 1) Arcalie (formerly Ārokajja, Kallesdorf), Transylvania: Lindenschmit 1881, Heft IV, pl. 1, 5; Hampel 1887, pl. 59, 2. (Figs 22, 58; 27)
- 2) Cannes-Écluse, dép. Seine-et-Marne, hoard I: Gaucher and Robert 1967, 199, fig. 40, 9. (Fig. 22, 9)
- 3) Kemnitz, Ostprignitz: Jacob-Friesen 1927, 172–4; Matthes 1929, 173; Piggott 1983, 111, fig. 63. (Fig. 22, 32)
- 4) Obišovce (formerly Abos), East Slovakia: Lindenschmit 1881, Heft IV, pl. 1, 1; Hampel 1887, pl. 59, 1; Nicholson 1980, 60, pl. 24, 111. (Figs 22, 47; 23)

Although only associated once with other finds – in hoard I from Cannes-Écluse – these wheels should all be dated early in the Urnfield period. The fragment from Cannes-Écluse comes from the nave of a cast bronze wheel; a rib running around the cylindrical nave is still visible, and the bases of two spokes can also be seen. Almost all the finds from this hoard belong to Br D, for example the swords, median winged axes and wrist-spirals, only the knives seem to suggest a later (Ha A1) date.

The pair of bronze wheels from Obišovce, East Slovakia, should be given a similar date (Fig. 23). The spokes terminating in semicircular thickenings find parallels not only in wheel-shaped motifs on bronze sheet belts from the early Urnfield hoards of Uioara de Sus and Guşteriţa in Transylvania (Fig. 24), and on the wagon from Hart a. d. Alz (Fig. 25, 3), but also on late Mycenaean chariot depictions (Fig. 25, 1–2) and Linear B wheel ideograms¹ (Fig. 26, 7.11). Considering the early tradition of thickened spoke terminals in Greece and Crete, the wheels from Obišovce and the Central European depictions of such wheels clearly indicate a

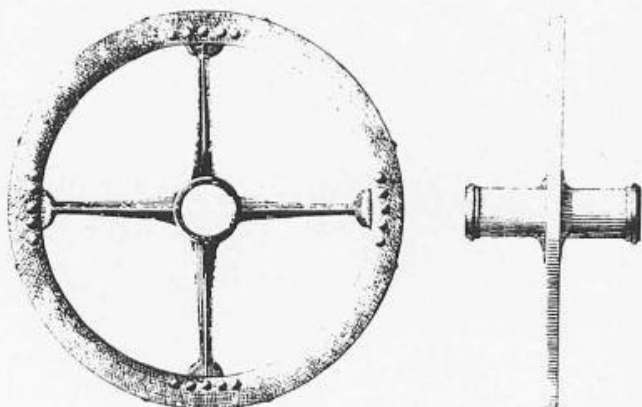


Fig. 23 Bronze Wheel from Obišovce, Slovakia (after Lindenschmit 1881). – Scale ca. 1:11.

horizon of technological influence which doubtless derived from the Aegean area. Like the Obišovce examples, the pair of bronze wheels from Arcalie in Transylvania was deposited without any other surviving objects (Fig. 27). The light construction with four thin spokes, however, suggests a similar date to the Obišovce examples. The segment of a bronze felloe from Kemnitz, Ostprignitz, is closely related to the felloe segments of the Arcalie wheels.

The wheels from Obišovce and Arcalie and the felloe segment from Kemnitz are of remarkably light construction. They stand in stark contrast to the later bronze wheels of the Coulon group but resemble, on the other

¹ The Mycenaean contacts shown by the wheels with thickened spokes are discussed in greater detail in an article by the author: Pare 1987a.

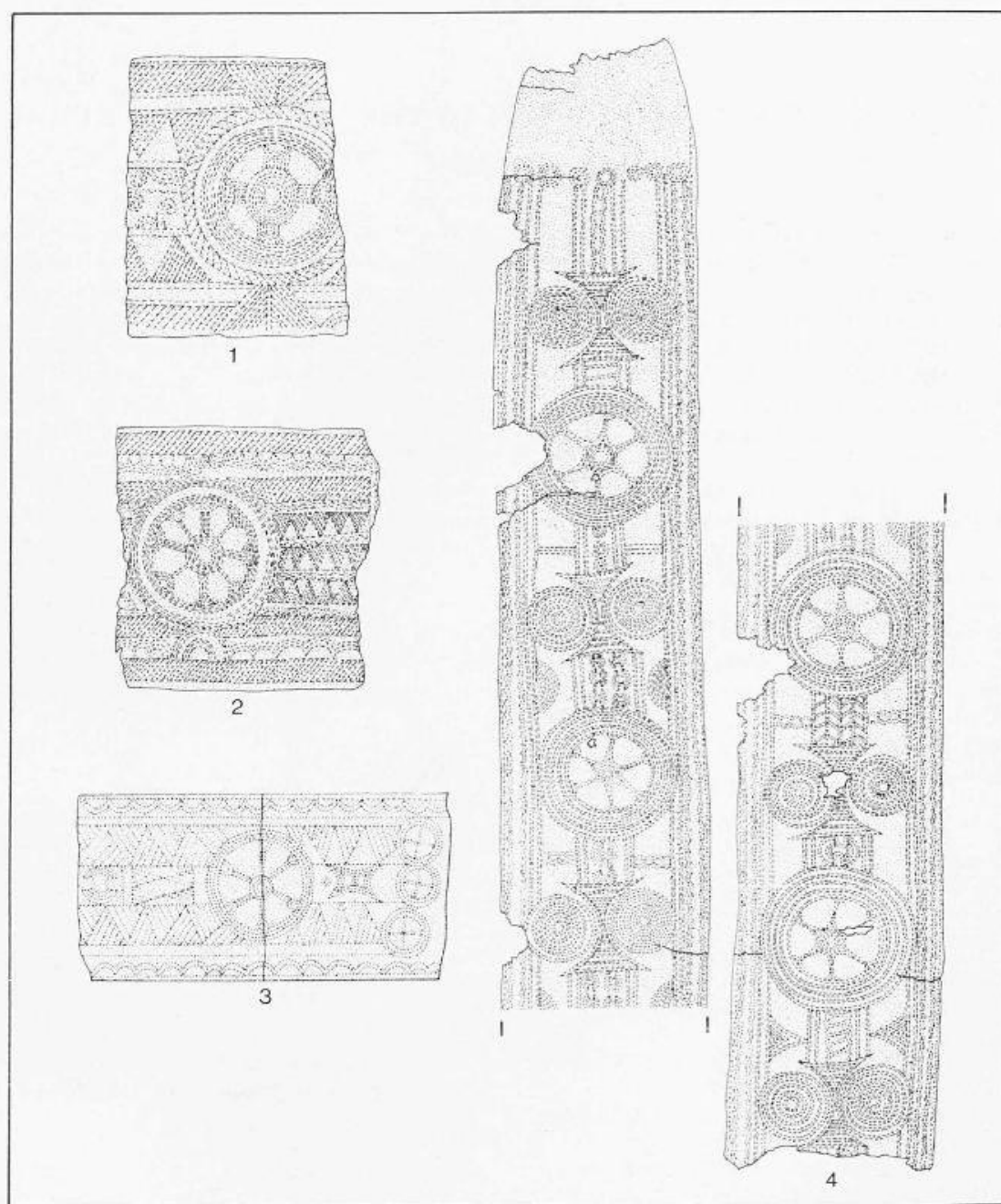


Fig. 24 Bronze belt-sheets with spoked wheel depictions from Transylvanian hoards: 1-2.4 Uioara de Sus, 3 Gușterița (after Petrescu-Dîmbovița 1978). – Scale 1:3.

hand, the wheels on late Mycenaean chariot representations. The Obišovce wheels find particularly close parallels on a late Mycenaean Crater from Kition (Figs 23; 25, 1). When one recalls that the Aegean world also knew bronze wheels, as the Linear B tablets show (tablet So. 894, 2: Vandenabeele and Olivier 1979, 141), then the Central European bronze wheels, above all the pair from Obišovce, can surely be attributed to Mycenaean contacts. But it remains uncertain whether our wheels actually include Aegean imports, or whether they should

all be regarded as local imitations. It is interesting to note, however, that the wheels from Obišovce and Arcalie were apparently deposited as pairs so that they could be interpreted as chariot wheels, corresponding to Aegean usage – and not from a four-wheeled wagon. Considering our conclusions in Ch. 2, these contacts may be interpreted as the last signs of Mycenaean influence on vehicle construction, which already began in the Early Bronze Age.

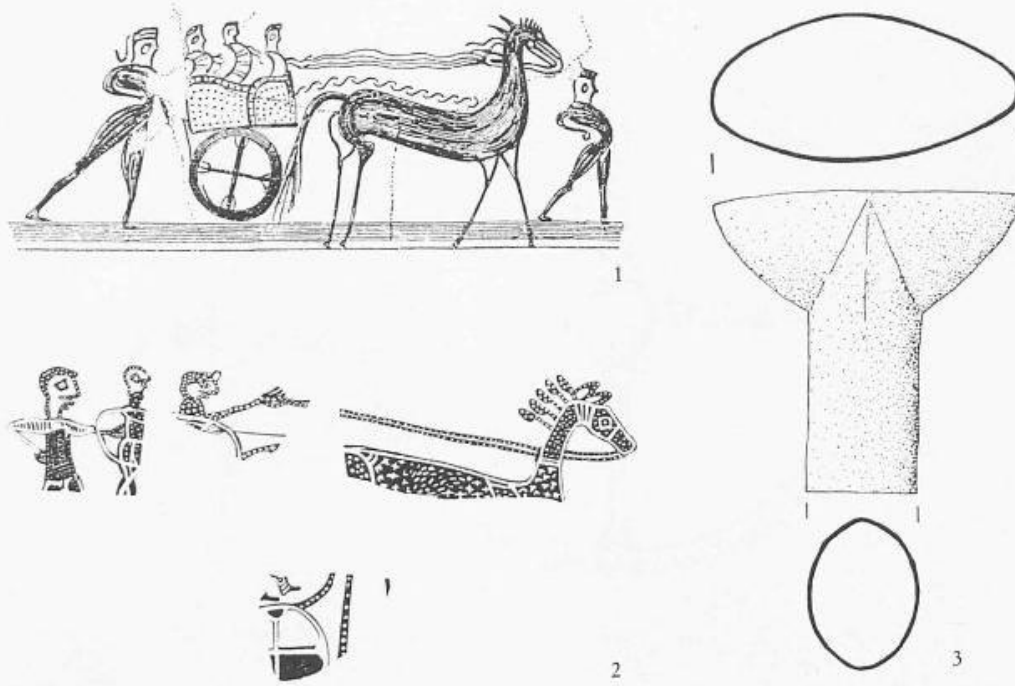


Fig. 25 Evidence of spokes with thickened ends: 1 Kition, Mycenaean crater; 2 Tiryns, Mycenaean crater; 3 Hart a. d. Alz, bronze spoke fitting (1 after Pottier 1907; 2 after Crouwel 1981; 3 after Müller-Karpe 1956). – Scale 3 1:4, otherwise not to scale.

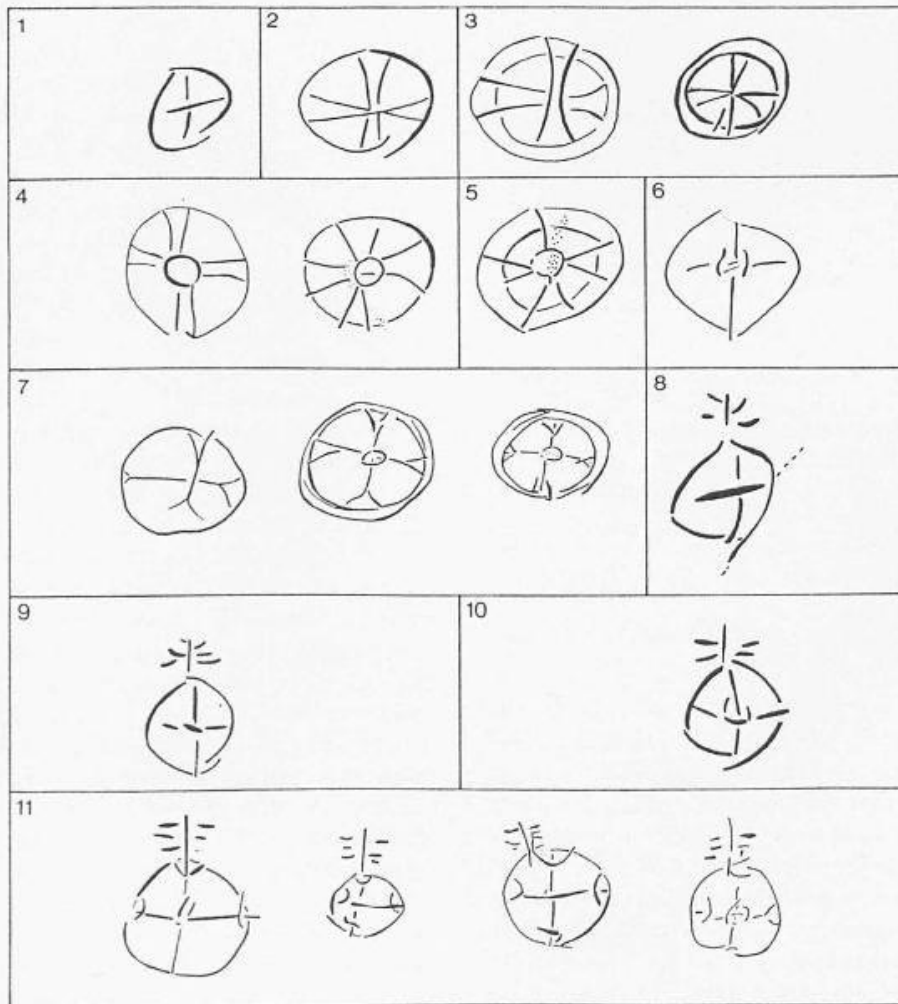


Fig. 26 Linear B wheel ideograms (after Vandenabeele and Olivier 1979).

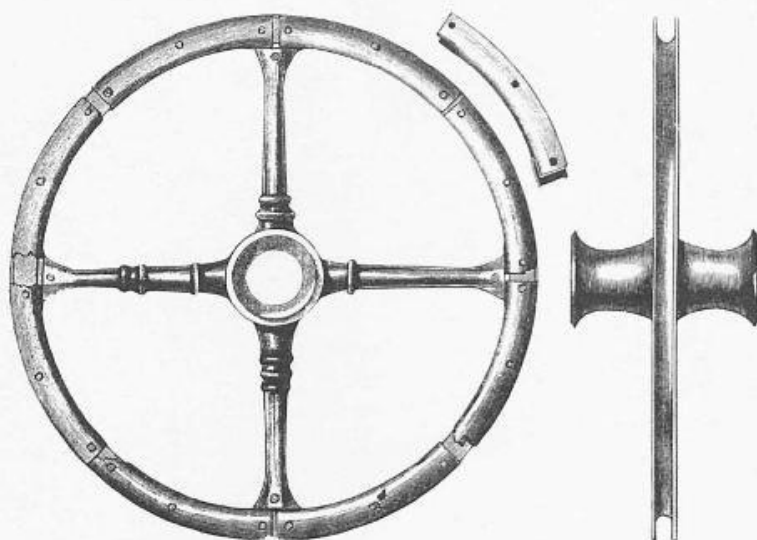


Fig. 27 Bronze wheel from Arcalie, Transylvania (after Hampel 1887). — Scale 1:10.

3.2 CAST BRONZE NAVES OF THE TARCAL GROUP

A. Mozsolics drew attention to this group of finds in 1956, in a comprehensive article; examples are today known from nine find locations (Fig. 22).

- 1) Caransebeș, jud. Caraș-Severin, Transylvania. Hoard of 1894: Petrescu-Dîmbovița 1978, pl. 87, 31. (Fig. 22, 52)
- 2) Gîrbău, jud. Cluj, Transylvania: unpublished; the author is grateful to T. Soroceanu, Cluj, for information about this hoard find. (Fig. 22, 55)
- 3) Futog (formerly Futtak), Batschka district, Vojvodina: Mozsolics 1956, 7, fig. 3, 3–4. (Fig. 22, 46)
- 4) Nádudvar-Halomzug, Kom. Hajdú-Bihar: Máthé 1972, 412, fig. 6, 1–2. (Figs 22, 51; 28, 3)
- 5) Pericein (formerly Szilágysomlyó-Perecsény), Transylvania: Mozsolics 1956, 7, fig. 3, 2. (Fig. 22, 53)
- 6) Sajóvámos, Kom. Borsod-Abaúj-Zemplén: Mozsolics 1956, 6, fig. 2, 1; *ibid.* 1973, pl. 13, 10. (Fig. 22, 48)
- 7) Tarcál, Kom. Borsod-Abaúj-Zemplén: Mozsolics 1956, 7, fig. 3, 1; 8, fig. 4. (Figs 22, 49; 28, 2)
- 8) Viștea (formerly Magyarvista), jud. Cojocna, Transylvania: Roska 1937, 195, no. 7a and 185, fig. 26. (Figs 22, 54; 28, 1)
- 9) Saalfelden, BH Zell am See, Land Salzburg: Moosleitner 1982b, 465, fig. 8, 44. (Fig. 22, 40)

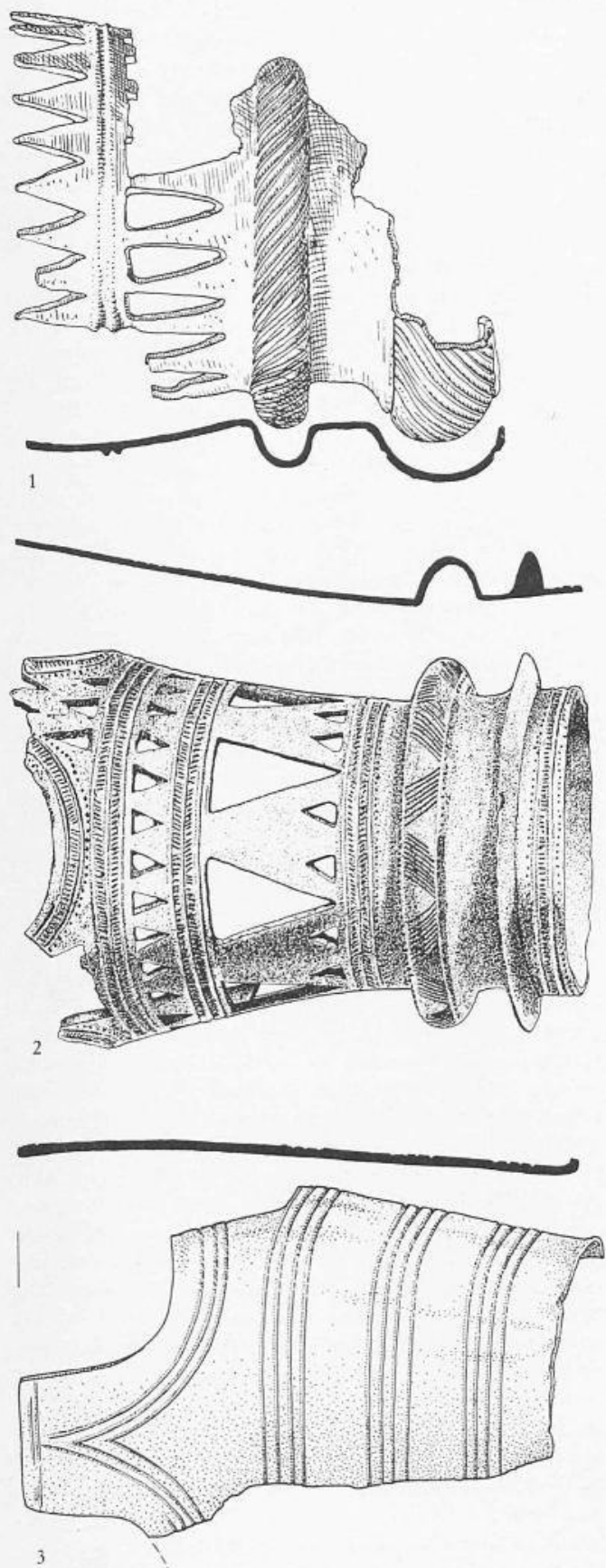
Our knowledge of the wagons with cast nave fittings of the Tarcál group is severely obstructed by their circumstances of discovery. In five cases these fittings, or fragments, were the only wagon finds in hoards (Sajóvámos, Futog, Caransebeș, Gîrbău, Nádudvar-Halomzug), two pieces are single finds (Pericein, Viștea) and one piece (Tarcál) possibly came from a cemetery. For this reason it remains unknown with which other bronze fittings these wagons were furnished. Among the sorts of fittings which come into question are the bronze axle-caps from Trenčianske Bohuslavice and Bobrovček,

but also certain ornithomorphic protomes (see below, section 3.7 and note 11).

According to their associated finds the naves can be dated from Br D (Sajóvámos) to Ha B1 (Nádudvar-Halomzug). During this time the naves seem to have undergone a certain typological development, starting from examples with zig-zag decoration along the inner rim (Sajóvámos, Pericein, Viștea [Fig. 28, 1], Futog, Caransebeș), leading to an example with triangular openwork decoration and four semicircular spoke apertures (Tarcál [Fig. 28, 2]) and finally to examples with grooved decoration and four semicircular spoke apertures (Nádudvar-Halomzug [Fig. 28, 3], Gîrbău). A bronze fragment from Saalfelden, Land Salzburg, may have belonged to a related type of nave fitting (Moosleitner 1982b, 465, fig. 8, 44).

It is not easy to fit these nave fittings into our general picture of the Urnfield wagons. The grooved decoration on the later pieces from Gîrbău and Nádudvar-Halomzug possibly shows a relationship with the ribbed decoration on the naves of the Coulon and Bad Homburg groups, for example Cortailod, Weinheim-Nächstenbach (Fig. 40, 1) and Wehringen (Pl. 95B). The grooved and triangular openwork decoration of the older pieces (Pericein, Viștea, Tarcál [Fig. 28, 1–2]) is comparable to that on a bird protome from Zsujta. Whether such protomes were mounted on the same wagons as the nave fittings remains uncertain but considering the geographical position of Zsujta (on the Tisza, only slightly to the north of Sajóvámos and Tarcál), the possibility should not be dismissed (for a list of bird protomes see note 11).

It is an open question whether the nave fittings of this group were used on two- or four-wheeled vehicles. However, considering the elaborate form and decoration of the fittings, it is assured that they were mounted on splendid conveyances with an eminent function.



3.3 WAGON FITTINGS OF THE HART A. D. ALZ GROUP

The Hart a. d. Alz group includes finds from 11 graves and two hoards (Fig. 22); a twelfth wagon-grave has recently been excavated at Poing, Bavaria – for an interim report see Winghart (1989). The grave finds have always been allotted an important rôle in the Urnfield period.

- 1) Bern-Kirchenfeld, Kanton Bern: Schiek 1956b; Drack 1961. (Figs 22, 21; 30, 3.6–8.10)
- 2) Bruck, Kreis Neuburg a. d. Donau, 'Fundstelle 5': Eckstein 1963, 83, fig. 3. (Figs 22, 37; 30, 5.13)
- 3) Hader, Kreis Griesbach: Müller-Karpe 1956, 69, fig. 8; 70, fig. 9; Pätzold and Uenze 1963, 65–7; pls 28–31. (Figs 22, 41; 29, 3; 30, 2)
- 4) Hart a. d. Alz, Kreis Altötting: Müller-Karpe 1956. (Figs 22, 39; 25, 3; 30, 4; 31)
- 5) Kaisten, Kanton Aargau: Drack 1961, 74; 75, fig. 1B. (Fig. 22, 23)
- 6) Königsbrunn, Kreis Heidenheim a. d. Brenz: Anon. 1973, 248; 247, fig. 1; Hüttel 1981a, nos 182–3. (Fig. 22, 35)
- 7) Lorsch Wald, 'Torfgraben', Kreis Bergstraße, tumulus of 1838: Herrmann 1966, pl. 141E, 2. (Fig. 22, 27)
- 8) Mengen, Kreis Saulgau, grave of 1905: Paret 1935a, 28–30; pl. 11; Dehn 1967. (Figs 22, 33; 29, 1–2; 30, 9.11)
- 9) Mengen, Kreis Saulgau, grave of 1955: Schiek 1962. (Figs 22, 34; 30, 1)
- 10) Reventin-Vaugris, 'La Poype', ar. Vienne, dép. Isère: Chantre 1875, pl. 32, 5; Courtois 1960, 16, fig. 13, 9; 17, fig. 14, bottom right; Audouze and Courtois 1970, pl. 25, 70. (Fig. 22, 12)
- 11) Rýdeč, okr. Litoměřice, Bohemia: Schráníl 1928, pl. 33, 31; Kytlicová 1967, 149, fig. 5; von Brunn 1968, 110; Pleiner 1978, 460, fig. 135, 12. (Fig. 22, 42)
- 12) St. Sulpice, Kanton Waadt: Reverdin 1931, 36–7; pl. 4; Drack 1961, 74; 75, fig. 1A. (Fig. 22, 15)
- 13) Staudach, BH Wildshut: Müller-Karpe 1956, 71, fig. 10; Pittioni 1954, 556, fig. 386. (Figs 22, 38; 30, 12)

The 11 graves of the Hart a. d. Alz group are of primary importance not only for our knowledge of the wagons of the Urnfield period, but also for the question of the origins of the wagon-graves of the Hallstatt period. Nevertheless the burial rites make serious problems for our understanding of these graves and especially for our knowledge of wagon construction. Judging from the signs of burning on the wagon fittings, the deceased was obviously cremated together with his wagon. The burnt objects only partly survived the cremation pyre; many objects, particularly the smaller ones, were completely melted. It is also uncertain how carefully the burnt bronze objects were collected from the pyre and our studies are hindered by the fact that the bronze objects were sometimes intentionally broken even before the cremation (e.g. Bern-Kirchenfeld; Mengen grave of 1955). For these reasons we must bear in mind the probability that only an incomplete selection of the wagon and harness fittings, sometimes also of the personal goods, was deposited in the graves. Furthermore the graves were mostly either badly damaged (e.g. Bruck) or badly excavated (Lorsch Wald, St. Sulpice etc.). Thus caution is required in the interpretation of these important wagon finds.

Fig. 28 Cast bronze nave fittings of the Tarcal group: 1 Viștea, Transylvania; 2 Tarcal, Kom. Borsod-Abaúj-Zemplén; 3 Nádudvar-Halomzug, Kom. Hajdú-Bihar (1 after Roska 1937; 2 after Mozsolics 1956; 3 after Máthé 1972). – Scale 1:2.

The rôle of the wagon in the burial customs of the early and older Urnfield period is primarily attested by metal wheel components. The nave and spoke fittings and the axle-caps from Hart a. d. Alz deserve special mention (Müller-Karpe 1956, 64, fig. 6). Müller-Karpe was able to reconstruct a four-spoked wheel on which the slightly biconical nave was covered with cast bronze fittings (*ibid.* 1956, 67, fig. 7). The nave fittings bear four low ribs and an angular flange on their outer edge (*ibid.* 1956, 64, fig. 6, 7). Related nave fittings are known from Mengen 1905, now together with a cast nave-ring with an angular flange² (Fig. 29, 1) and ribbed bronze sheet bands (Fig. 29, 2). Comparable bronze sheet fittings in the graves from Bern-Kirchfeld and Kaisten probably also came from naves (Schiek 1956b, 275, fig. 2, 13–4; Drack 1961, 75, fig. 1B, 6).

But it is not only the wheel fittings which provide secure evidence for wagons. Items of paired harness, which were obviously used for paired draught horses, are found in four graves (Königsbronn: two bronze bits; Mengen 1905: four cheek-pieces; Kaisten: three cheek-pieces; St. Sulpice: four cheek-pieces). In three other graves only bronze rein-knobs (Hader, Bruck) or rein-knobs and a single cheek-piece (Mengen 1955) survived from the horse-gear. Thus with the aid of wheel fittings and bridle pairs a rôle for the wagon in Urnfield burial customs can be demonstrated in six graves (Hart a. d. Alz; Bern-Kirchfeld; Mengen 1905; Kaisten; Königsbronn; St. Sulpice).

It is more difficult to understand the other bronze fittings from these graves which, particularly because of their association with wheel fittings and horse-gear, are generally assumed to belong to wagons (a selection of typical pieces is shown on Figs 29 and 30). In this context, however, it should be recalled that wagon-graves could also contain other wooden objects fitted with bronze, for example items of furniture.³ Thus in Greek Geometric art a bed is regularly depicted on funerary hearses (e.g. Ahlberg 1971, figs 53–5) and on many pictorial representations, for example in Etruscan art, chairs or thrones are to be seen on wheeled vehicles (e.g. Figs 147–8; Woytowitsch 1978, pl. 46, 154.251). Nevertheless it will be argued here that almost all these typical bronze fittings had a function as wagon components.

Among the Hart a. d. Alz finds are two fragmentary horn-shaped sockets and a large junction-element (Fig. 31). All three objects were of cast bronze, and were badly damaged by the cremation fire. The open ends of the bronze horns have a rectangular cross-section (internal dimensions 47.5 × 52.5 mm), with a semicircular aperture in the upper and lower sides; after 40 mm the socket begins to taper and assumes a round cross-section. The socket is bent into a horn shape; the point, however, survives on neither piece. On the concave side of the curved horn are the remains of a bronze attachment which has likewise not survived. The horn-shaped part of the socket is circumscribed with groups of grooves,

whereas the rectangular socket is only decorated with grooves on three sides. The undecorated surface of the socket must be the lower side, indicating that the horn-shaped sockets should be reconstructed pointing upwards (Fig. 31).

The junction-element also had a socket with rectangular cross-section (internal dimensions ca. 52.5 × 55 mm). This socket is again decorated with grooves on only three sides, indicating that it was originally positioned with its profiled tube pointing upwards (Fig. 31). After about 80 mm the junction-element assumed an oval cross-section. This part had two cylindrical lateral projections, each terminating with a thickened rim. After the lateral projections the junction-element is almost completely melted and its original appearance is unknown.

According to H. Müller-Karpe (1956), the junction-element was clearly attached to a timber beam the other end of which was terminated by a horn-shaped socket (Fig. 31). This can be deduced not only from their rectangular sockets of equal size, but also by the similar ornamentation with transverse grooves decorating both the junction-element and the horn-shaped sockets. Accordingly we must reckon that there were originally two junction-elements to fit with the two horn-shaped sockets.

The junction-element and the horn-shaped sockets indicate a wooden construction with a substructure of heavy rectangular beams and a superstructure made of thinner round rods. Although little more can be said about the wooden construction, our observations allow us to draw reliable conclusions concerning its function. As mentioned above, not only a wagon but also pieces of furniture come into question. The size and above all the length of the junction-element and horn-shaped sockets exclude an interpretation as furnishings for a chair or throne. The only conceivable larger piece of furniture is a bed or bier. But this interpretation is rendered unlikely not only by the massive timbers required by the fittings' sockets, hardly necessary for such furniture, but also by the complex construction of the object. For example the lateral projections on the junction-element, which resemble channels for a small axle, would have no use on a bed. There only remains a function on a wagon which, accordingly, must have had an elaborate construction.

Judging from our interpretation of the horn-shaped sockets from Hart a. d. Alz, a number of similar sockets from other graves can be regarded as wagon fittings. The horns are in two cases associated with paired bits, which reinforces our conclusions (Königsbronn, St. Sulpice). Corresponding to the Hart a. d. Alz examples, these sockets also have bronze attachments on the inner side of the horn: in St. Sulpice a profiled knob (Drack 1961, 75, fig. 1A, 2), in Königsbronn a waterbird (Anon. 1973, 247, fig. 1, lower). Horn-shaped sockets like St. Sulpice were also found in the grave from Hader (Fig. 29, 3) and in a hoard of the early Urnfield period from Rýdeč, okr. Litoměřice (Pleiner 1978, 460, fig. 135, 12). The double

² A comparable fragmentary nave-ring was found in the hoard of Reventin-Vaugris.

³ I would like to thank Dr P. Schauer for his valuable suggestions on this subject.

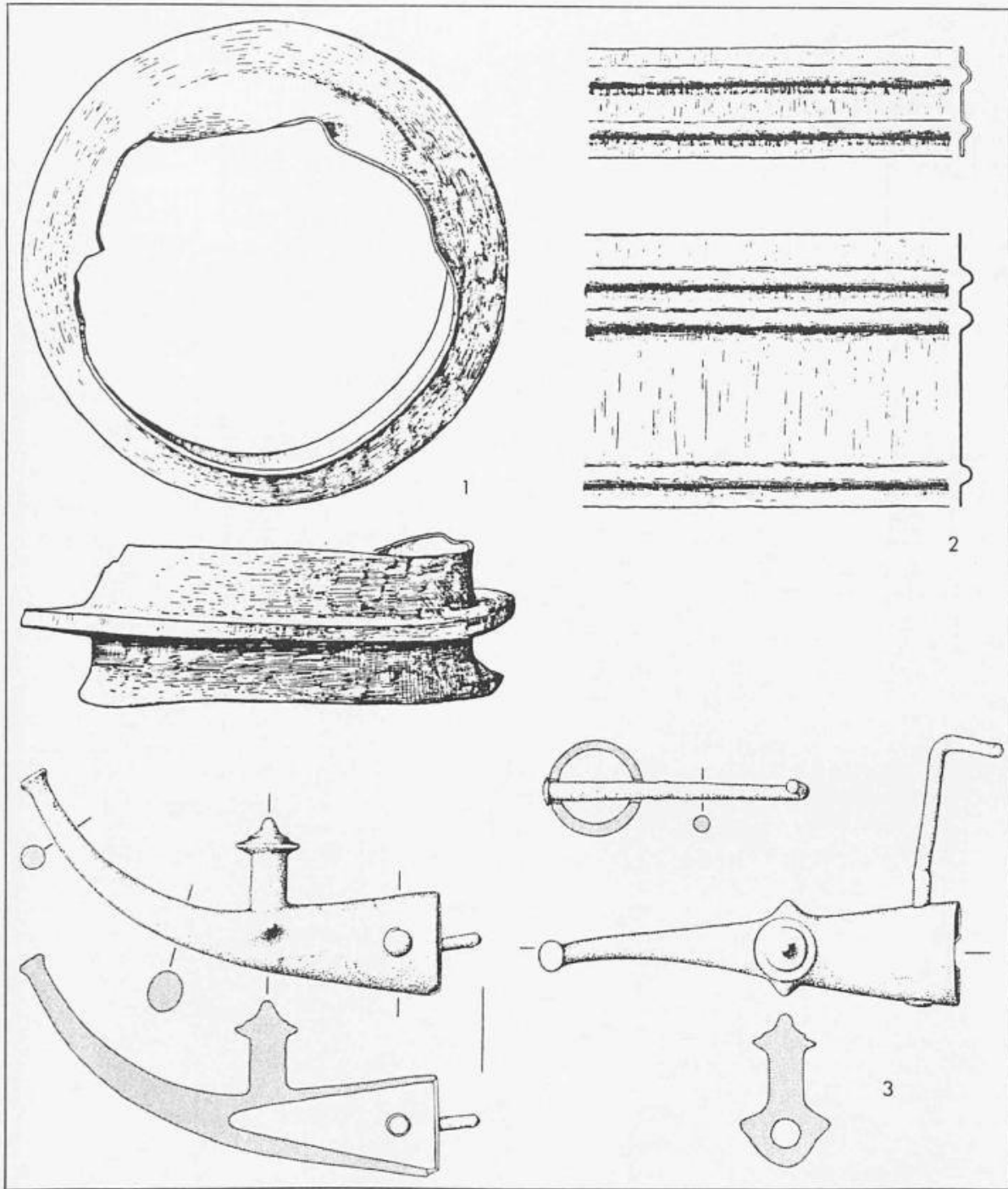


Fig. 29 Wagon fittings of the Hart a. d. Alz group: 1–2 nave fittings from Mengen, grave of 1905; 3 horn-shaped socket from Hader (1–2 after Dehn 1967; 3 after Pätzold and Uenze 1963). – Scale 1:2.

socket from the Lorscher Wald is rather different, but should likewise be interpreted as a wagon component, particularly because of its profiled knob and nipple decoration, which is closely paralleled on the pieces from Hader, St. Sulpice and Rýdeč (Herrmann 1966, pl. 141E, 2). A knob in the grave of 1955 from Mengen could also come from a horn-shaped socket (Schiek 1962, 132, fig. 2, 5). Horn-shaped sockets without attachments on the inner side of the horn come from Hader (Pätzold and Uenze 1963, pl. 28, 2) and Staudach (Müller-Karpe 1956, 71,

fig. 10, 3–5). These simple sockets are less characteristic than those with attachments, but the Hader example, owing to its similarity to the other horn-shaped sockets in the grave, but also owing to its long bent nail, should be regarded as a wagon component.

A further type of fitting which occurs frequently in our graves is a baluster-like object. These show a considerable range of variation but are all rod-shaped, with both ends formed so that they could be anchored in wood. The examples from Hader existed in two sizes (ca. 101 and 185

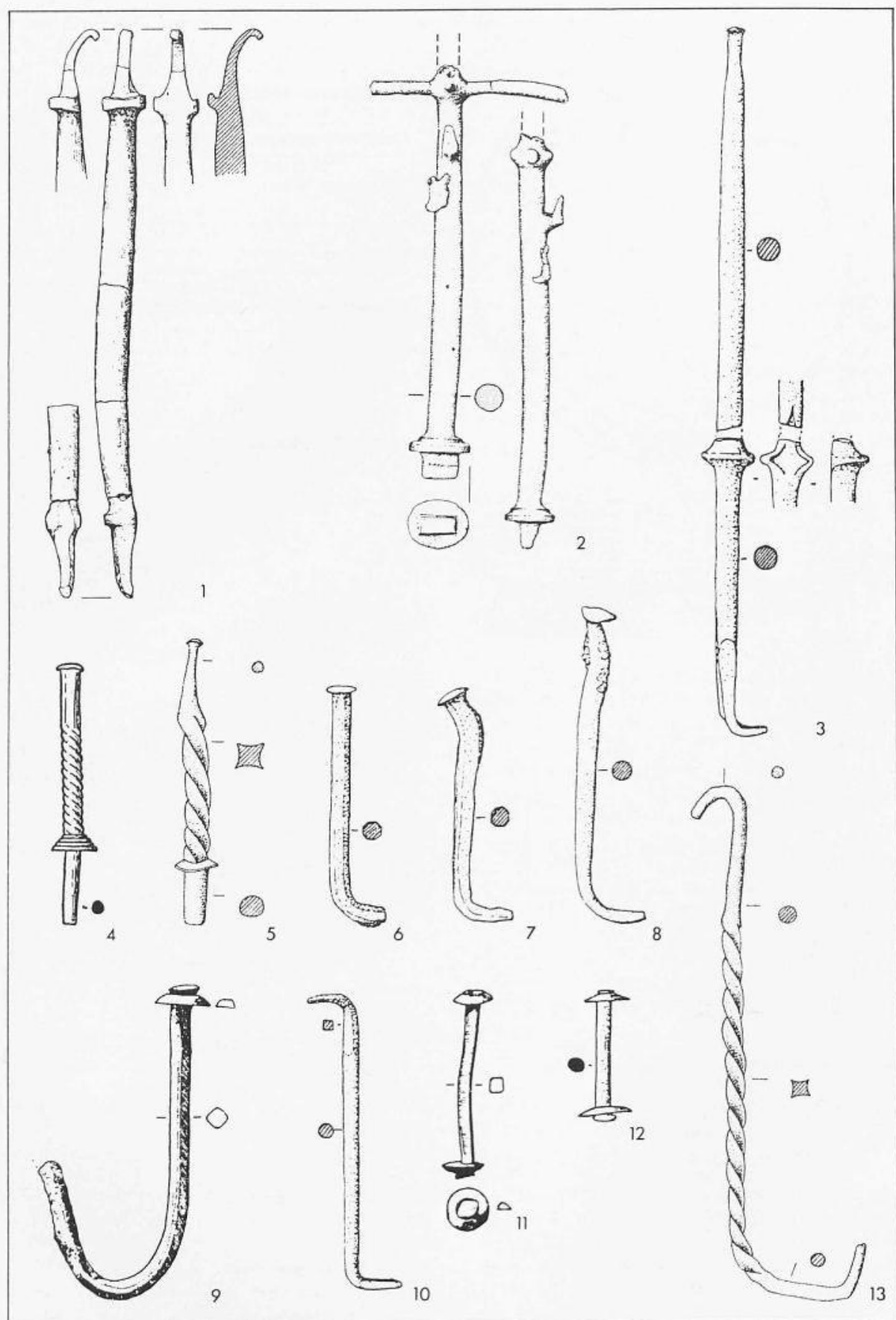


Fig. 30 Wagon fittings of the Hart a. d. Alz group: 1-5 Balusters, 6-9 bent nails, 10.13 hook-shaped bronze rods, 11-12 double rivets. 1 Mengen, grave of 1955; 2 Hader; 3.6-8.10 Bern-Kirchensfeld; 4 Hart a. d. Alz; 5.13 Bruck; 9.11 Mengen, grave of 1905; 12 Staudach (1 after Schiek 1962; 2 after Pätzold and Uenze 1963; 3.6-8.10 after Schiek 1956b; 4.12 after Müller-Karpe 1956; 5.13 after Eckstein 1963; 9.11 after Dehn 1967). - Scale 1:2.

mm in length), and were provided with thick cast-on lateral bronze wires (Fig. 30, 2; Pätzold and Uenze 1963, pls 28, 3–5; 29, 2.7). All the balusters from Hader have, on their upper ends near the cast-on wires, nipple decoration like that on the grave's horn-shaped sockets (compare Figs 29, 3 and 30, 2; Pätzold and Uenze 1963, pls 28–9). Because the balusters and horns bear the same decoration it is likely that they were all fitted on the same wooden object, namely the wagon. The upper ends of the balusters from Bern-Kirchfeld were tapered and then hammered flat like a rivet, the lower ends, in contrast, were hammered to a point and resemble nails (Fig. 30, 3). The lower, pointed ends were obviously hammered into wood and then bent over: the nail-like lower part shows that the balusters were mounted on massive timbers with a thickness of up to 90 mm. The Bern-Kirchfeld balusters must therefore have been fitted to a wagon, the only conceivable wooden construction on which such heavy timbers would be appropriate.

Good parallels for the Bern-Kirchfeld balusters are known from the grave of 1955 from Mengen (Schiek 1962, 132, fig. 2, 7). But balusters are also known from Hart a. d. Alz (Fig. 30, 4) and Bruck (Fig. 30, 5), now with the middle part twisted. Like those from Hader and Bern-Kirchfeld, the balusters from Mengen 1955, Hart a. d. Alz and Bruck are also to be interpreted as wagon components.

The long nails found in some of our graves were also most likely used on wagons: Bern-Kirchfeld (Fig. 30, 6–8; Schiek 1956b, 275, fig. 2, 1–6); Mengen 1905 (Fig. 30, 9; Dehn 1967, pl. 1, 4); Mengen 1955 (Schiek 1962, 133, fig. 3). The length of the nails, and their bent ends, show that they were hammered into pieces of wood up to 98 mm thick. As explained above, such massive timbers are only to be expected in the construction of a wagon. Furthermore our graves also contain long hook-shaped bronze rods, the original function of which is uncertain: Bern-Kirchfeld (Fig. 30, 10; Schiek 1956b, 274, fig. 1, 8–9); Bruck (Fig. 30, 13); Hader (Pätzold and Uenze 1963, pl. 30, 1–2.5.7–8); Mengen 1955 (Schiek 1962, 133,

fig. 3, 12). Nevertheless it is probable that these too had a function on wagons, for example when one takes into account the similar twisted decoration on the hook-shaped rods and balusters from Bruck (Fig. 30, 5.13). The last type of fitting present in several of our graves is the double rivet. These are known from four graves: St. Sulpice (Drack 1961, 75, fig. 1A, 5); Königsbronn (with nine unpublished examples); Mengen 1905 (Fig. 30, 11; Dehn 1967, pl. 1, 3); Staudach (Fig. 30, 12; Müller-Karpe 1956, 71, fig. 10, 6). It is impossible to judge the exact function of the rivets. Although they doubtless joined together wooden components, a function on a wagon remains conjectural.

Many other fittings are represented in our graves which, although there is no certain evidence, could quite possibly have been used on the wagons. The handle-like object from Kaisten can be mentioned (Drack 1961, 75, fig. 1B, 4), likewise the bronze sheet fittings from Mengen 1955 (Schiek 1962, 135, fig. 4, 15) and the socket-shaped fittings from Hart a. d. Alz (Müller-Karpe 1956, 63, fig. 5, 6.8.10–12). It is tempting to imagine the decorative nails in the form of waterbirds, stars and lozenges from Hart a. d. Alz and Königsbronn as ornaments for the wagon-boxes (Müller-Karpe 1956, 63, fig. 5, 1–3; Anon. 1973, 247, fig. 1), and the same could be true for the disc-shaped examples from Kaisten and Mengen 1905 (Drack 1961, 75, fig. 1B, 2; Dehn 1967, pl. 1, 2).

It has been argued here that the horn-shaped sockets, the balusters, the long nails and perhaps the hooked rods were all used on wagons. These objects, together with the wheel fittings and paired bridlery, allow us to define our 11 graves as wagon-graves. However the find from Staudach remains questionable, containing no certain wagon components. Staudach's horn-shaped sockets are untypical; secure horse-gear is also not included among the grave finds. The fittings from our graves give little information about the original appearance of the wagons. But the wheel fittings from Hart a. d. Alz and Mengen 1905 and the horse-gear make clear that they were not models, but full-size vehicles. Only the small horn-shaped

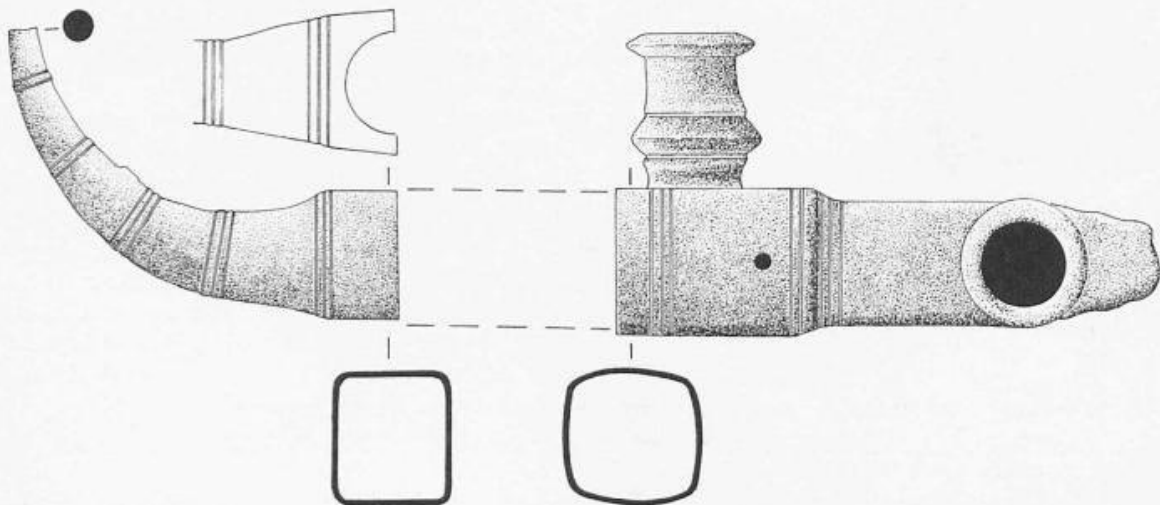


Fig. 31 Hart a. d. Alz: horn-shaped socket and socketed fitting, bronze (after Müller-Karpe 1956). – Scale 3:10.

sockets from Staudach, with an internal diameter of only 20 mm, could indicate a model wagon.

It is only certain in the case of Hart a. d. Alz that the vehicle had four wheels. However the construction of the other vehicles, with elaborate railings and balustrades, precludes a reconstruction as chariots. Instead they were large heavy vehicles, as the wagons' components sometimes show (e.g. the junction element from Hart a. d. Alz or the long nails from Bern-Kirchfeld and Mengen 1955). It is also interesting to note that the wagon fittings, which come from three phases of the Urnfield period (Br D to Ha A2), show an unmistakable relatedness. Accordingly there was a continuous tradition of wagon construction, building these splendid wagons over a period of about 200 years.

The function of the wagons is a matter of conjecture (see the discussion in Ch. 12.1). But it seems important that they were deposited in precisely the sort of grave (rectangular, north-south orientated chamber graves) which in the earlier Urnfield period, in the area to the north of the Alps, was reserved for the highest recognisable social class. Furthermore weapons are particularly common in the graves, indicating that the wagons were most likely linked with a warlike social group. It is also of interest that the wagons were cremated along with the deceased, suggesting that the wagon was involved in religious ideas about death and the afterlife.

3.4 WAGON FITTINGS OF THE EGEMOSE GROUP

G. Jacob-Friesen described these fittings in 1969 in a detailed study of the finds from Skjerne and Egemose. Ten finds are listed here (Fig. 22).

- 1) Autavaux, Kanton Freiburg: Jacob-Friesen 1969, 140, fig. 9, 1; 141, fig. 10, 1-3. (Figs 22, 18; 32, 4)
- 2) Charleville, dép. Ardennes, 'from the Meuse near Charleville': RGZM, Mainz, inv. no. O.35979. (Figs 22, 13; 33)
- 3) Chevroux, Kanton Waadt: Jacob-Friesen 1969, 140, fig. 9, 2. (Figs 22, 19; 32, 2)
- 4) Egemose, Svendborg Amt, Funen: *ibid.* 1969. (Figs 22, 30; 32, 3.5)
- 5) Estavayer, Kanton Freiburg: *ibid.* 1969, 140, fig. 9, 8-9. (Figs 22, 17; 32, 6)
- 6) Rohov, okr. Opava, Moravia: *ibid.* 1969, 124, fig. 2. (Fig. 22, 44)
- 7) Skjerne, Mariibo Amt, Falster: *ibid.* 1969. (Figs 22, 31; 32, 1)
- 28) Vuilly-le-Haut, Kanton Freiburg: *ibid.* 1969, 140, fig. 9, 3. (Fig. 22, 20)
- 29) Vuilly-le-Bas, Kanton Freiburg: *ibid.* 1969, 140, fig. 9, 4-5. (Fig. 22, 20)
- 210) Zürich-Wollishofen, 'Haumesser': *ibid.* 1969, 140, fig. 9, 6. (Fig. 22, 24)

The most important find *ensembles* are those from Skjerne and Egemose. The Egemose bronzes were deposited in a pottery vessel: many showed signs of burning, others had been intentionally damaged. Of the three bronze objects from Skjerne, we only know that they were found together (Jacob-Friesen 1969, 126-7). Jacob-

Friesen succeeded in demonstrating that the bronzes from Skjerne and Egemose were all imports to Scandinavia, probably from the *Pfahlbaukreis*. The fact that the finds had all been imported from the same source suggests that they may have been functionally related. Indeed, according to G. Jacob-Friesen, both hoards contained almost exclusively wagon fittings, and could therefore be interpreted as depositions of dismantled and damaged cult vehicles. The hoards are clearly not chance collections of bronzes: instead perhaps, as von Merhart wrote of the Egemose find 'sehr wohl das Brucherz eines lange verwahrten und endlich bedeutungslos gewordenen kultischen Geräts' (1957, 116; Jacob-Friesen 1969, 124-5). Even though the circumstances of discovery of this group of fittings (hoards, settlements and one river find) make conclusions difficult, the two Scandinavian hoards show that they were wagon components.

Four types of fitting are characteristic for the Egemose group: axle-caps, zoomorphic protomes, hand-rails and various bronze tubes (Fig. 32). The only fittings for which a function on a wagon is beyond doubt are the small bronze axle-caps from Rohov and Skjerne (Fig. 32, 1), with an internal diameter of ca. 30 mm; also perhaps a horned fragment from Egemose if it is interpreted as a linchpin (Jacob-Friesen 1969, 133, fig. 5, 15). On the other hand we have the zoomorphic protomes, hand-rails and tubes. Jacob-Friesen convincingly reconstructed two bronze fragments from Egemose as a hand-rail, corresponding to examples from the Swiss lake-side settlements of Autavaux and Chevroux (*ibid.* 1969, 133, fig. 5, 1-3). The Swiss hand-rails bear characteristic ribbed decoration on their tubular projections (Fig. 32, 2), corresponding to the ornamentation of the zoomorphic protome from Egemose (Fig. 32, 3). Owing to the related decoration one can assume that the hand-rail and protome from Egemose were fitted to the same object. Some cast bronze tubes from Egemose and from various Swiss lake-side settlements, especially Autavaux, also have the ribbed decoration which is so typical for this group (Fig. 32, 4-6; Jacob-Friesen 1969, 140, fig. 9, 3-9; 141, fig. 10, 1-3). It is beyond doubt that the tubes from Autavaux and the hand-rail from the same settlement were used together. The same is then probably true for the fragmentary cast tubes, the hand-rail and the zoomorphic protomes from Egemose.

Although the cast zoomorphic protomes, hand-rails and tubes were therefore probably functionally related, it still remains to be demonstrated that they were fitted to wagons. Certain similarities to wagon fittings of the Hart a. d. Alz group point to this conclusion. The zoomorphic protomes incorporating features of bulls and waterbirds, from Egemose (Fig. 32, 3), Skjerne and 'Charleville' (Fig. 33), are provided with sockets, like the horns of the Hart a. d. Alz group. The sockets of the protomes of the Egemose group correspond in size with the ribbed tubes from Egemose and from the Swiss lakeside settlements. Accordingly, the protomes and tubes could together have formed a railing or balustrade construction similar to that suggested for the Hart a. d. Alz group. Moreover, the bent nails with profiled bases from Egemose (Fig. 32, 5; also

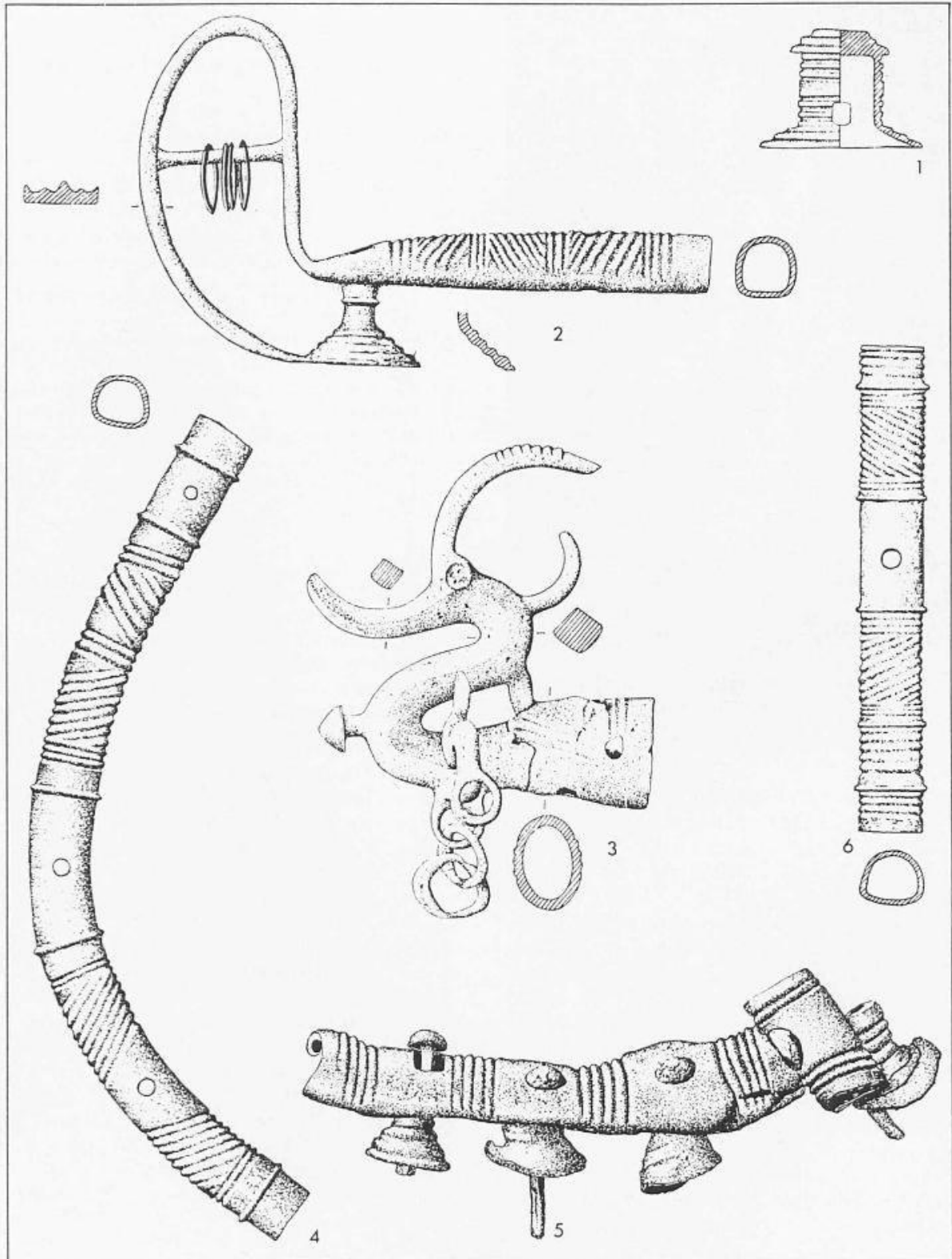


Fig. 32 Wagon fittings of the Egemose group: 1 Skjerne, 2 Chevroux, 3.5 Egemose, 4 Autavaux, 6 Estavayer (after Jacob-Friesen 1969). — Scale 1:2.



Fig. 33 'Charleville': cast bronze socket with horned water-bird protome.

from other finds: Jacob-Friesen 1969, 141, fig. 10, 15–25) could have held together the railing construction in the same manner as the balusters of the Hart a. d. Alz group.

If it is accepted that these objects are wagon fittings, then we must be dealing with full-size vehicles. This is not only evidenced by the length of the cast tubes, but also by the large hand-rails, which betray a certain similarity with the double socket from the Lorscher Wald (see above, section 3.3). The small axle-caps from Skjerne and Rohov do not indicate model wagons but instead, like the small axle-caps from Hart a. d. Alz, belong to a small axle joining the wagon and draught pole (Müller-Karpe 1956, 64, fig. 6, 3). Such small axles allowed the pole to be moved in a vertical direction, and certainly could only have had a purpose on a four-wheeled vehicle.⁴

The chronological position of these finds was discussed authoritatively by G. Jacob-Friesen (1969, 150). The bronze Fuchsstadt cup in the hoard from Rohov indicates

a date in Period IV. The other finds of the Egemose group probably belong to Ha B/Period V, and Egemose itself should probably be allocated a particularly late position (Ha B3).

3.5 CAST BRONZE WHEELS OF THE COULON GROUP

Although the cast bronze wheels of the Coulon group have only been discovered from ten locations, their importance in the Urnfield period has always been acknowledged. The tenth find, from La Côte-Saint-André (Fig. 35, 2; Chapotat 1962), is best dated to the Hallstatt period and is for that reason omitted from this list.⁵

- 1) Cortaillod, Kanton Neuenburg: Keller 1863, pl. 14, 7–8. (Fig. 22, 16)
- 2) Coulon, dép. Deux-Sèvres: Gendron and Pautreau 1985, 12–13; *ibid.* 1986, 459–60. (Fig. 22, 1)
- 3) Fa, dép. Aude: Lindenschmit 1881, Heft IV, pl. 1, 2; Guislaine 1972, 298–300; pl. 10, 3. (Fig. 22, 9)
- 4) Haßloch, Kreis Bad Dürkheim: Hundt and Ankner 1969. (Fig. 22, 25)
- 5) Langres, dép. Haute-Marne: Lepage 1981, 64, fig. 6. (Fig. 22, 14)
- 6) Nîmes, dép. Gard: Lindenschmit 1881, Heft IV, pl. 1. (Fig. 22, 11)
- 7) Stade, Niedersachsen: Jacob-Friesen 1927; Drescher 1958, pls 1–2. (Figs 22, 29; 34; 35, 1)
- 8) Triou, dép. Deux-Sèvres: Pautreau et al. 1984, 80–3, figs 32–3. (Figs 22, 2; 36)
- 9) Amboise, dép. Indre-et-Loire, 'Dépôt des Châtelliers': Cordier et al. 1960, 109–17; Cordier 1985, 305; 316, fig. 1, 20; Parc 1987b, 54, fig. 22, 7. (Fig. 22, 6)

These wheels represent the highest achievement of Central European bronze-casting in the Urnfield and Hallstatt periods and, according to H.-J. Hundt, are comparable in their technological complexity to the casting of classical bronze statues (Hundt and Ankner 1969, 29). Detailed studies, particularly concerning technology, have been made on the wheels from Stade (Jacob-Friesen 1927; Drescher 1958, 16–29), La Côte-Saint-André (Chapotat 1962) and Haßloch (Hundt and Ankner 1969). The distribution of the wheels (Fig. 22) shows a loose scatter, particularly in the valleys of the Rhône, Loire and Saône (Nîmes, La Côte-Saint-André, Cortaillod, Langres), with outliers at the foot of the Pyrenees (Fa), on the Rhine (Haßloch) and as far as the mouth of the Elbe (Stade). As H.-J. Hundt already remarked, the name 'Stade type' for these wheels is unsuitable, considering the peripheral location of the Stade find (Hundt and Ankner 1969, 25). The wheels are instead named here after the newly discovered example from Coulon.

⁴ Small pole axles are found later, in the Hallstatt period, for example on the wagons from Hochdorf and Ca' Morta; they are discussed in Ch. 9.4.

⁵ The parallels for the La Côte-Saint-André situla date to the 7th century BC: Frankfurt-Stadtswald (U. Fischer 1979, pls 8–9); Břasy, Bohemia (Pič 1900, pl. 29, 1; Hralová 1987, 25, fig. 1A); Vetulonia, 'Tomba del Duce 4' (Montelius 1904, pl. 186, 11a.b); Fabriano, grave of 1899 (Brizio 1899, 377, fig. 5; 378, fig. 5a). But note now the newly-published dendrochronological date for the felloes of the La Côte-Saint-André wheels: 745–735 BC (Bocquet 1990, 36f.).

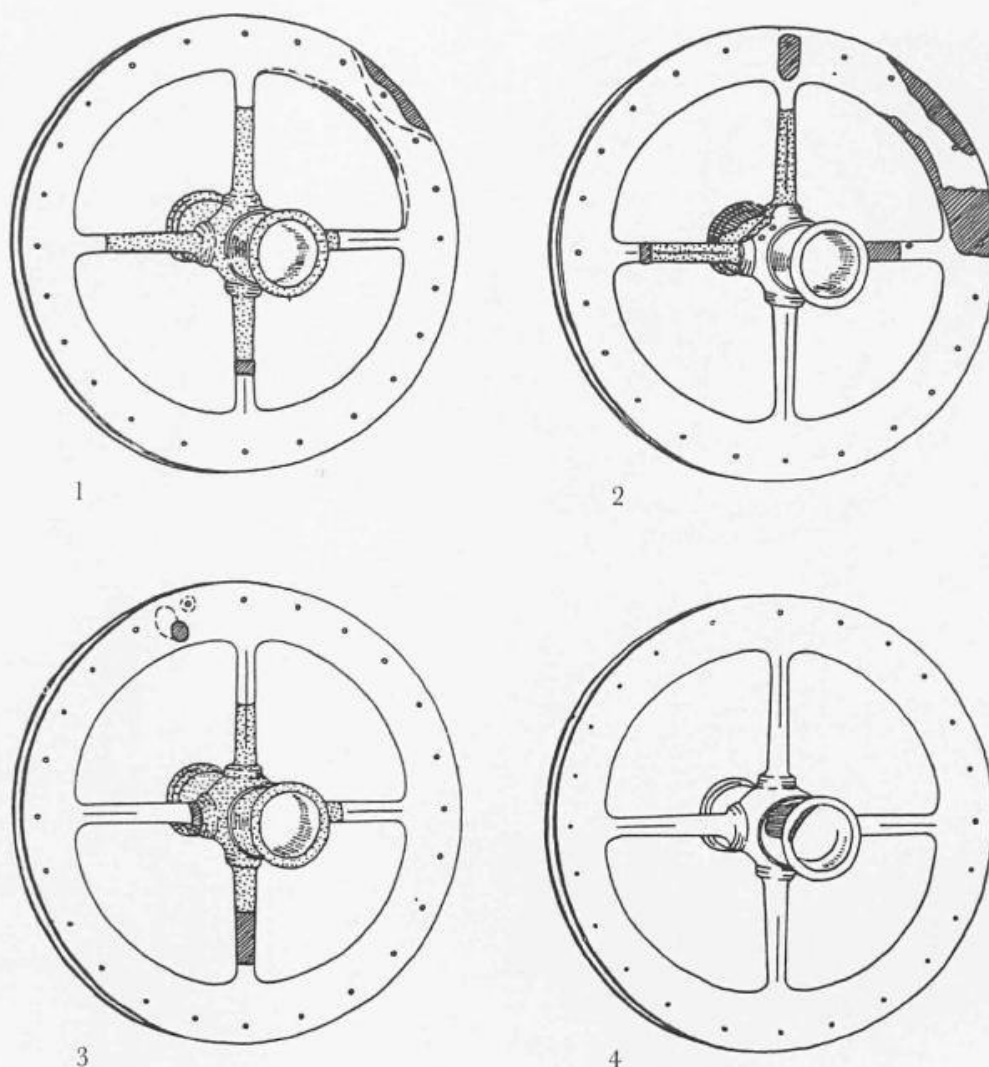


Fig. 34 The bronze wheels from Stade, showing the various casting phases (after Drescher 1958). – Scale 1:10.

The wheels are all of bronze, and apparently all cast in one piece. The study of the Stade wheels by H. Drescher, however, showed how the casting caused great problems. In Stade the casting was only fully successful in the case of one wheel (wheel 4), the other wheels (1–3) had to be cast together from several parts (Fig. 34; Drescher 1958, 16–29). The wheels have four (Cortailod, Stade), five (Haßloch, Langres, Nîmes, Fa, Coulon) or six spokes (La Côte-Saint-André), and measure 474–580 mm in diameter. The naves are cylindrical with lengths of 330–395 mm, and are always covered with rich ribbed decoration. The relatively large internal diameter of the naves (70–80 mm) and the lack of signs of wear on their internal surfaces shows that they were provided with a wooden lining.

The metal felloes of the wheels had a ‘U’ or rounded ‘V’-shaped cross-section, open to the outside, and obviously served to accommodate wooden felloe segments. Precise information is available for the felloe construction of the Stade wheels (Fig. 35, 1). Two of the Stade wheels were deposited one on top of the other: the wooden felloe

segments, which extended 50 mm beyond the bronze felloe, are visible as a shadow on the patina of one of the wheels. Furthermore, remains of wood indicate that the wooden felloe was made from four segments. A similar construction is evidenced for La Côte-Saint-André but now, corresponding to the number of spokes, with six felloe segments; but in this case the original height of the wooden felloe segments is unknown (Fig. 35, 2). On the wheels from both these finds and on the wheel from Coulon, the felloes were made of oak.

In order to hold fast the wooden felloe segments, the bronze felloe was provided with rivets (Fig. 35). This construction with an outer segmental felloe held by rivets to an inner felloe is also documented by the felloe fittings from Bad Homburg (see below and Fig. 39) and Wehringen (Pl. 97A), and could even be related to the so-called ‘Großstadt’ felloe construction of Ha C. It is interesting to note that the felloe segments on the La Côte-Saint-André wheels were not the original ones. The old segments had been replaced: the new segments were simply notched and fitted over the already-existing rivets.

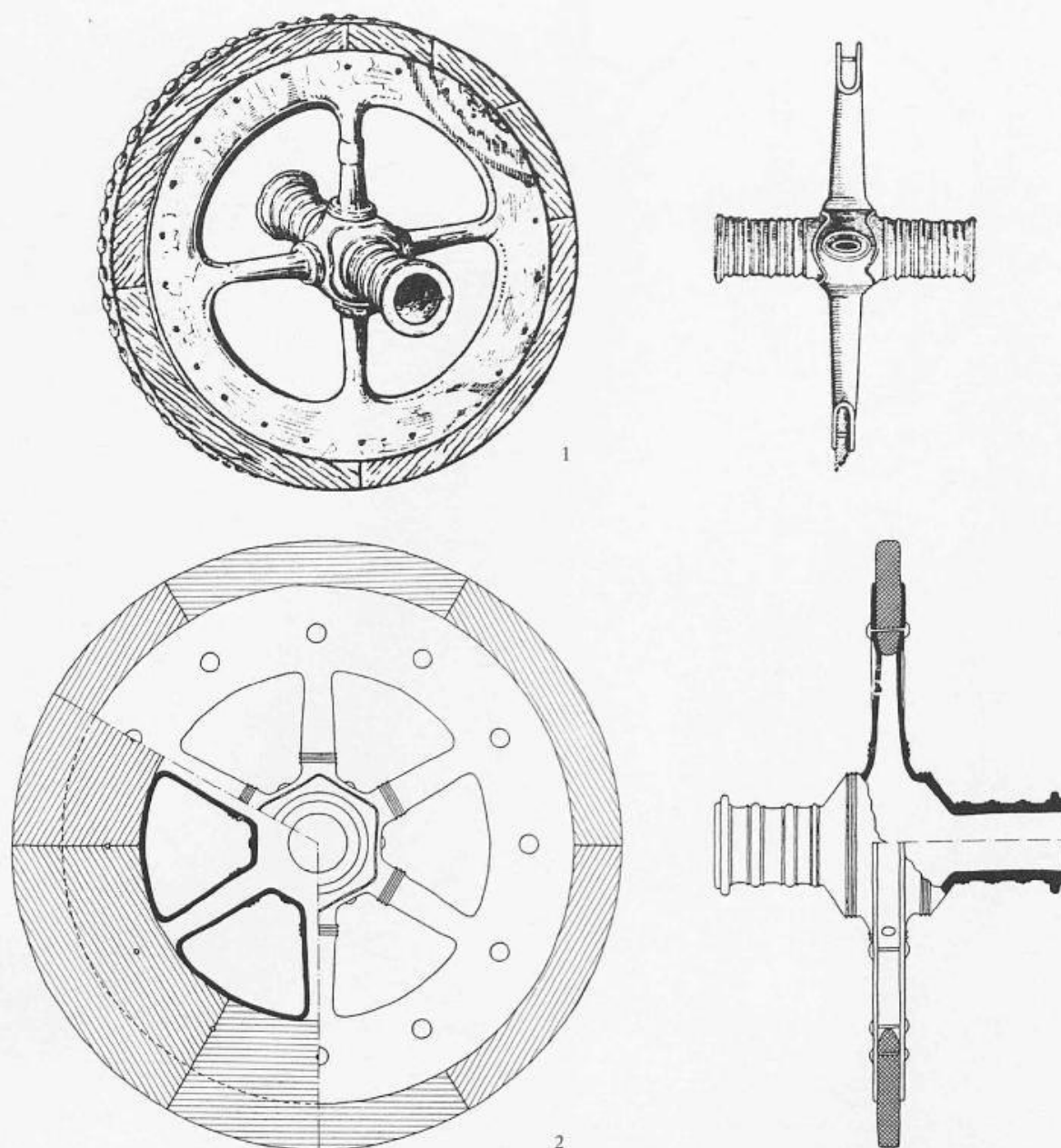


Fig. 35 The felloe construction on wheels of the Coulon group: 1 Stade, 2 La Côte-St.-André (1 after Jacob-Friesen 1927; 2 reconstruction after information from Chapotat 1962, the felloe height is taken from the Stade example). — Scale 1:10.

Thus the wheels seem to have been in use for a considerable time. The bronze felloes of the wheels of the Coulon group are between 60 and 87 mm wide and, according to the Stade find, originally held wooden segments roughly 110–140 mm high. The whole wheels, i.e. complete with the wooden segments, are therefore to be reconstructed with diameters ranging from about 580 to about 680 mm. With their heavy felloes, thick spokes and massive naves the wheels of the Coulon group can easily be distinguished from the lightly constructed Early Bronze Wheels described above.

The fragmentary bronze wheels in the hoards from

Triou (Fig. 36) and Amboise (Pare 1987b, 54, fig. 22, 7) are very important for the chronology of the Coulon group. Owing to the thickness of the Amboise fragment, it very probably belonged to a wheel of this type, and not to a nave fitting of the Bad Homburg group. The two fragments from Triou probably came from a typical cast wheel of the Coulon group (Fig. 36, 1). The reconstruction by Pautreau et al. (1984, 81, fig. 32), with short sockets on the nave for wooden spokes, is probably incorrect, judging from the rough surfaces of the 'spoke sockets', which suggest that the original bronze spokes had been broken off.⁶ Both wheels are clearly dated by their

⁶ Information kindly provided by S. Verger.

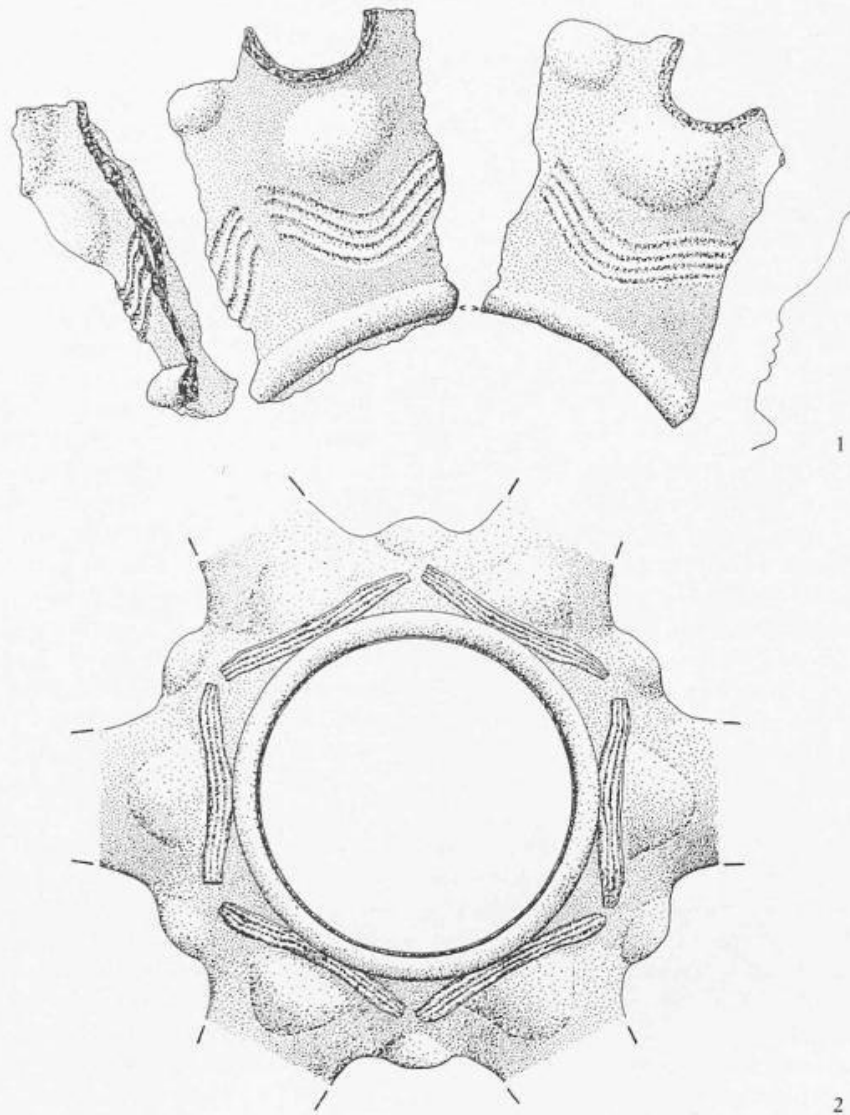


Fig. 36 Triou, dép. Deux-Sèvres: 1 fragments of a cast bronze nave, 2 reconstruction of the nave (after Pautreau et al. 1984). – Scale 1:2.

associated finds to Ha B3. The wheel from Cortailod, from the famous lake-side settlement, also speaks for a date in Ha B. On the other hand, the two bronze vessels associated with the La Côte-Saint-André wheels indicate a date in the 7th century BC – slightly later than the dendrochronological date of 745-735 BC, recently published by A. Bocquet (1990, 36f.).⁷ The observation by H.-J. Hundt and H. Drescher, that steel chisels were used in the production of the wheels from Stade and Haßloch, is not of great importance for chronology because iron tools were already frequently used in the Urnfield period (Bouzek 1978).

The distribution of the cast wheels (Fig. 22), as well as their dating, is similar to that of the wagon fittings of the Bad Homburg group, which will be discussed next.

3.6 WAGON FITTINGS OF THE BAD HOMBURG GROUP

These fittings are known from at least nine hoard finds. The wagon fittings from Wehringen, 'Hexenbergle', tumulus 8 also belong to the Bad Homburg group, but do not appear in the list below because the grave is dated to the Hallstatt period (see Ch. 10.1). The Wehringen wagon is therefore assigned here to 'wagon type 1' of the Hallstatt period (Ch. 8.2.1).

- 1) Azay-le-Rideau, dép. Indre-et-Loire: Cordier et al. 1959, 57ff. (Figs 22, 4a; 45, 1)
- 2) Bad Homburg, Hochtaunuskreis, Hessen: Herrmann 1966, 78-80. (Figs 22, 28; 37; 38; 39)

⁷ See note 5.

- 3) Choussy, dép. Loir-et-Cher: Breuil and Bouillerot 1912, 97ff. (Figs 22, 7; 42)
- 4) Launac, dép. Hérault: Cazalis de Fondouce 1900, 171ff. (Figs 22, 10; 44, 1)
- 5) Neuvy-sur-Barangeon, 'Petit-Villatte', dép. Cher: de Goy 1885. (Figs 22, 8; 41)
- 6) Notre-Dame-d'Or, dép. Vienne: Pautreau 1979, 338, pls 80–82. (Figs 22, 4b; 45, 2–3)
- 7) Saarlouis, Kreis Saarlouis: Kolling 1968, 190–1. (Figs 22, 22; 44, 2)
- 8) Vénat, dép. Charente: Coffyn et al. 1981. (Figs 22, 3; 43)
- 9) Weinheim-Nächstenbach, Rhein-Neckar-Kreis: Stemmermann 1933. (Figs 22, 26; 40)
- 10) 'Western Europe': Forrer collection, probably from Western Europe. RGZM, Mainz, inv. no. O.10306. (Fig. 44, 3)

Our understanding of the wagon fittings of the Bad Homburg group is due mainly to the excavation of tumulus 8 from Wehringen, 'Hexenbergle', because such fittings are otherwise known only from hoards (cat. no. 145; Figs 200–202; Pls 95B–97A). Only a well excavated grave find can provide information about the combination and function of wagon components whereas hoards, in contrast, often contain merely a chance collection of possibly unrelated fittings.

The wagon-grave from Wehringen 'Hexenbergle' was housed in a rectangular wooden chamber containing pottery vessels, a bronze Gündlingen sword, a winged chape and a small gold sheet cup (Figs 97–9; 200). From the wagon itself, the two axles and traces of the felloe of the north-east wheel survived, indicating a wheel diameter of 0.75 m. The distance between the axles (wheel base) measured 1.1 m. Remains of the wheels surviving on the axles show a wheel gauge of 1.4 m. The wheel furnishings included nave fittings (Pl. 95B), which were held to the wooden naves by bronze wedges (Pl. 96, 24), and small nailed bronze knobs which decorated the felloes (Pl. 97A). The cast bronze nave fittings were slightly conical in shape, had a flange on their outer side and were decorated with groups of three ribs.

Not only the wheels, but also the wagon-box was decorated with bronze fittings which, however, are very badly preserved. Among these fittings there are at least 13 simple bronze phalerae measuring about 100 mm in diameter (Pl. 96, 18–23). These were fastened to wood by long bronze nails. By the north-east wheel there were also the remains of four smaller discs (Pl. 96, 11–14). These consist of a disc with a central boss and triangular openwork decoration, and a separate ring with triangular cross-section. The ring formed the rim of the ornamental disc. These two parts were fixed by small bronze nails to a wooden base. The openwork bipartite discs were found associated with further wooden fragments covered with bronze sheet, which were probably attached in some way to the rear end of the wagon (Figs 201–202; Pl. 96, 11–17).

According to the position of the finds on the chamber floor, the four wheels were originally mounted on their axles, indicating that the wagon was essentially complete when deposited in the grave. The state of preservation makes a reconstruction difficult; but the many surviving wooden remnants show that in the construction of the

axles, felloes and wagon-box only oak had been used. Moreover, the grave find provides a reliable impression of the bronze furnishings used on the wagon.

As explained in detail in Ch. 10.1, the fact that the wagon fittings from Wehringen lack parallels in the Hallstatt period is of utmost importance for the interpretation of the grave. Instead we know parallels from at least nine hoards of the late Urnfield period.

The finds from the two hoards from Bad Homburg are especially interesting and lend their name to this group of wagon fittings. A cast bronze fragment comes from an intentionally broken nave cylinder, which again is decorated with groups of three ribs (Figs 37, 5; 38, 1). Furthermore there are well-preserved bipartite ornamental discs, each made from a cast disc with a central boss and a rim with 'D'-shaped cross-section (Figs 37, 1–2; 38, 4–9). The curvature of the discs and rims, and the nail holes both on the rims and on one of the discs, demonstrate how the two parts of the bipartite discs were held together. Like the Wehringen discs they were clearly held to a wooden base by small bronze nails. The large and small phalerae with central holes should also be mentioned in this context (Figs 37, 3–4; 38, 10–14). The curvature of both phalera types and the semicircular projections of the larger examples betray their function on the wheels' felloes. The larger phalerae clearly sat on the ends of the spokes (compare Fig. 37, 3 and pl. 136, 10); the smaller ones, on the other hand, presumably fitted on the felloe between the spokes. Although their method of attachment is not documented, it seems most likely that the phalerae sat on both sides of the felloe, presumably held together by a rivet hammered through the felloe, and they must have acted as felloe-clamps (Fig. 39). Four more phalerae from Bad Homburg are to be interpreted as wagon fittings (Figs 37, 6; 38, 15–18). They are of cast bronze bent with a uniform curvature, and are provided with a central hole. They are to be compared to the simple phalerae from Wehringen, and were probably fastened as decoration to the wagon-box by bronze nails.

The hoard from Weinheim-Nächstenbach serves as the next example of this group. Again there is a fragment of an intentionally broken cast bronze nave cylinder, once more decorated with groups of three ribs, now surviving with part of its external flange (Fig. 40, 1). The hoard also contains four cast bronze phalerae with central holes which, according to the comparanda from Bad Homburg and Wehringen, are most probably to be regarded as wagon ornaments, and were probably nailed to the wagon-box (Fig. 40, 2–5).

The hoard from Neuvi-sur-Barangeon, 'Petit-Villatte' contains fragmentary nave and spoke fittings (Fig. 41, 1–2). Only the outer rim of the nave survives, with a large flange with triangular cross-section and remains of the nave cylinder with a group of three ribs. The fragmentary spoke fitting comes from the outer end of the spoke where it met the felloe. The piece has remains of one rivet hole and is decorated with a pair of ribs. A bronze ring is also of interest; it has four holes, of which two still hold bronze nails (Fig. 41, 3). According to its similarity to the rings from Wehringen (Pl. 96, 13–14) and Bad Homburg (Fig.

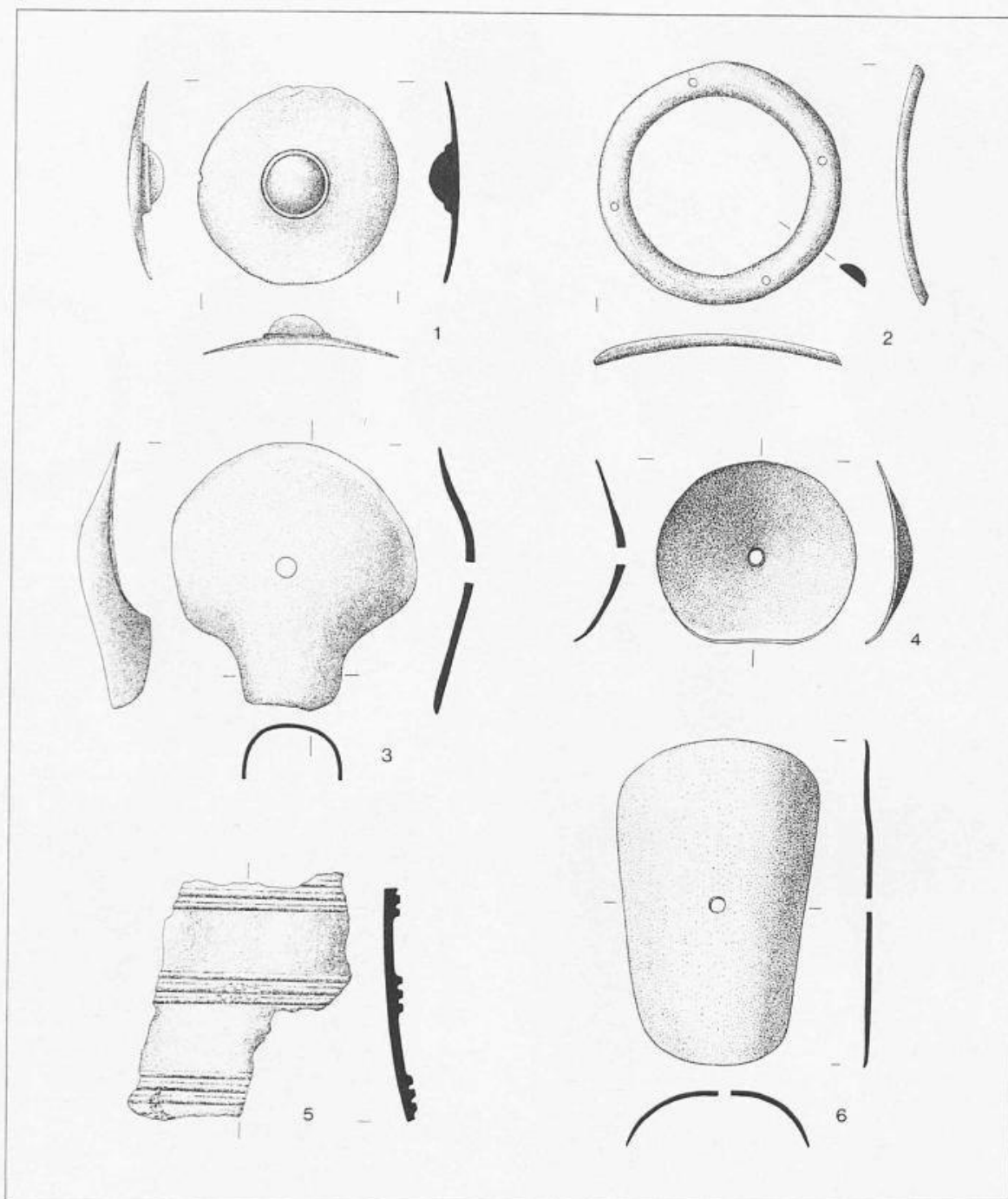


Fig. 37 Bad Homburg, Hochtäunuskreis: selection of the wagon fittings. — Bronze. — Scale 1:2.

37, 2), particularly because of its concave-convex curvature, it should be interpreted as the rim of a bipartite ornamental disc. A second, smaller ring cast with four nails has the same concave-convex curvature and is likewise to be regarded as a wagon-box ornament (Fig. 41, 4). From the same hoard come nine cast phalerae with central holes (Fig. 41, 5–7) – two still with long bronze rivets – which, like their parallels from Wehringen (Pl. 96, 18–23), Bad Homburg (Fig. 37, 6) and Weinheim-Nächstenbach (Fig. 40, 2–5), may also be considered as wagon-box ornaments.

From the hoard of Choussy we should mention a spoke

fitting (Fig. 42, 1) and two phalerae with long bronze rivets (Fig. 42, 2). They can also be interpreted as wagon fittings, and have close parallels in pieces from the neighbouring hoard of Neuville-sur-Barangeon (Fig. 41, 2.7).

Interesting wagon fittings are also to be found in the hoard of Vénat. The wheel components include remains of the nave cylinders (Fig. 43, 1–2) and a fragmentary spoke fitting (Fig. 43, 3), all with decoration in the form of groups of three ribs. Furthermore there are several cast bronze phalerae with central holes (Fig. 43, 4–6), one still holding a bronze nail (Fig. 43, 5) and one curved like

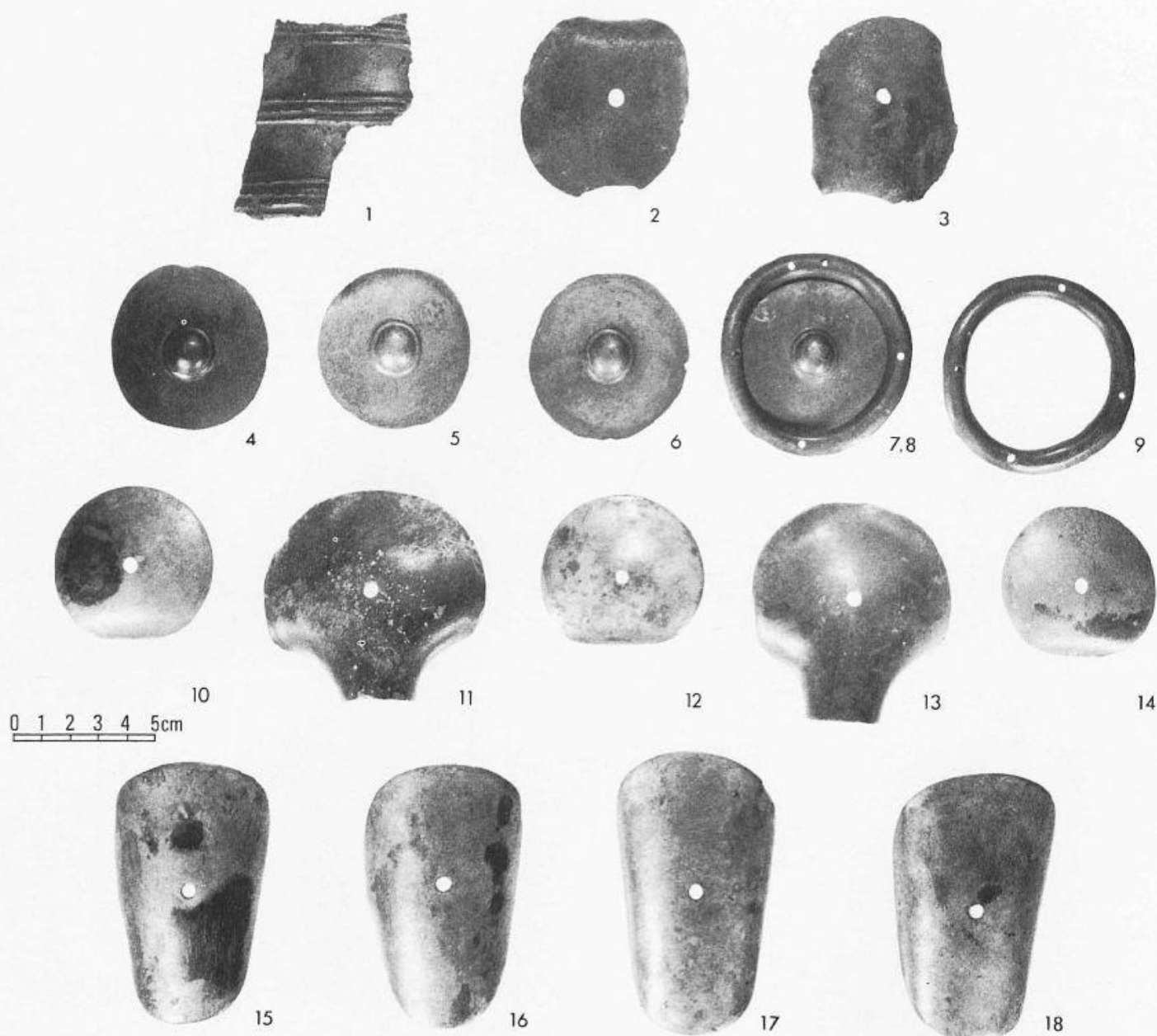


Fig. 38 Bronze wagon fittings from Bad Homburg, Hochtannuskreis.

examples from Bad Homburg and Neuvi-sur-Barangeon (compare Figs 37, 6; 41, 5; 43, 4).

Otherwise, wagon fittings of the Bad Homburg group are found alone in hoards. Fragments of nave cylinders come from the hoards of Launac (Fig. 44, 1) and Saarlouis (Fig. 44, 2) and, without a provenance or associated finds, from the collection of R. Forrer (Fig. 44, 3). Like the rest of Forrer's collection, this piece probably comes from Western Europe. These fragments have the light construction typical for the Bad Homburg group –

quite distinct from the wheels of the Coulon group (compare for example the fragment from Amboise: Pare 1987b, 54, fig. 22, 7). Cast bronze phalerae with central holes and sometimes with long bronze rivets are known from a number of other West European hoards, for example from Azay-le-Rideau (Fig. 45, 1) and Notre-Dame-d'Or⁸ (Fig. 45, 2–3). These phalerae are of simple, not very characteristic form, and therefore rather difficult to interpret. Nevertheless it seems quite likely that they, too, served as ornaments on wagon-boxes.

⁸ Similar phalerae are known from Challans, dép. Vendée (Eygun 1957, 83, pl. 8, 62); Déville-les-Rouen, dép. Seine-Maritime (Coutil 1899, 86ff., pl. 3, lower left); Auvernier, Lake Neuenburg (Gross 1883, pl. 25, 1); Helleved, Denmark (Thrane 1971, nos 21–2). Note that H. Thrane has also discussed these phalerae. In his work he calls the phalerae the 'Guevaux type' (1975, 133; 278–9, list 9). Thrane also contemplates a use on wagons.

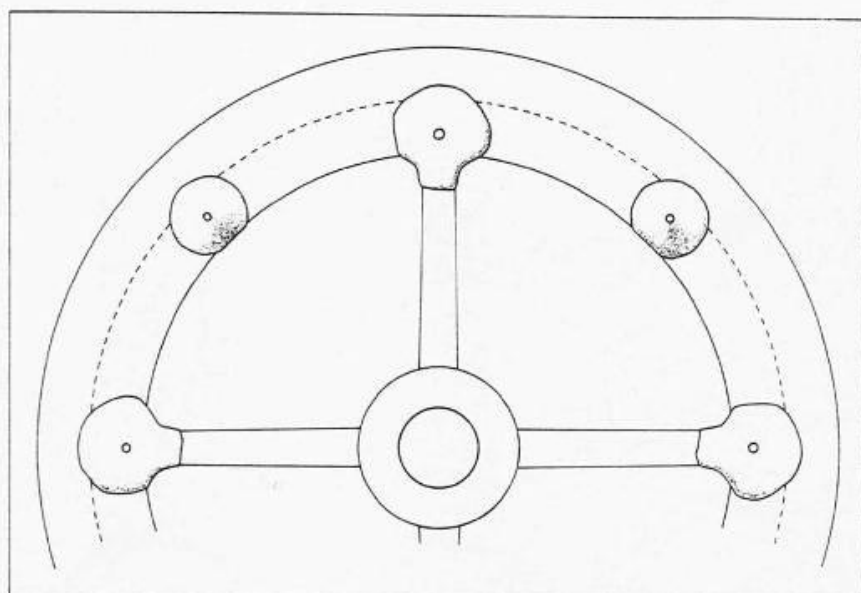


Fig. 39 Suggested use of the 'felloe-clamps' from Bad Homburg (compare Figs 37, 3-4; 38, 10-14).

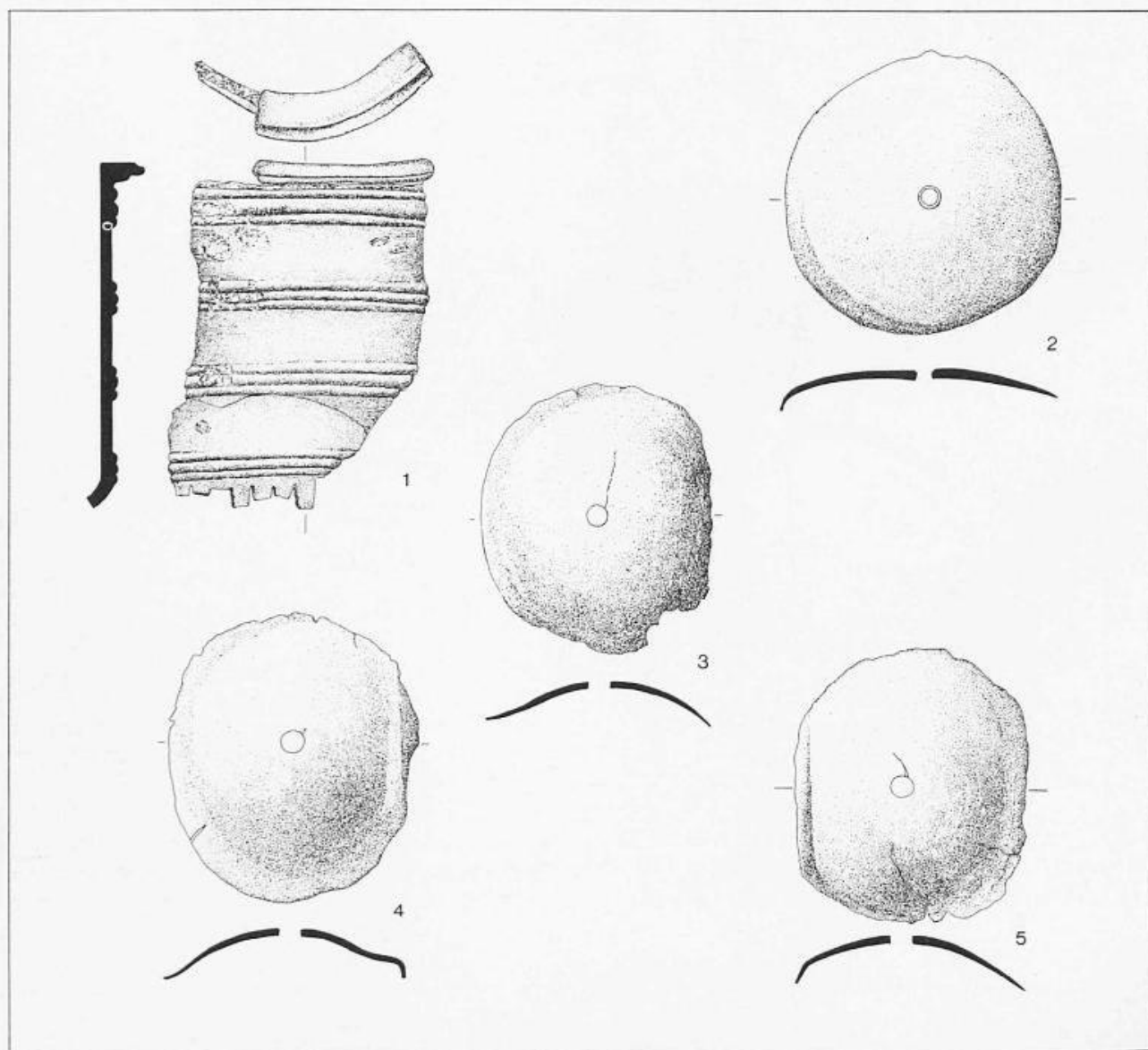


Fig. 40 Weinheim-Nächstebach, Rhein-Neckar-Kreis: wagon fittings. — Bronze. — Scale 1:2.

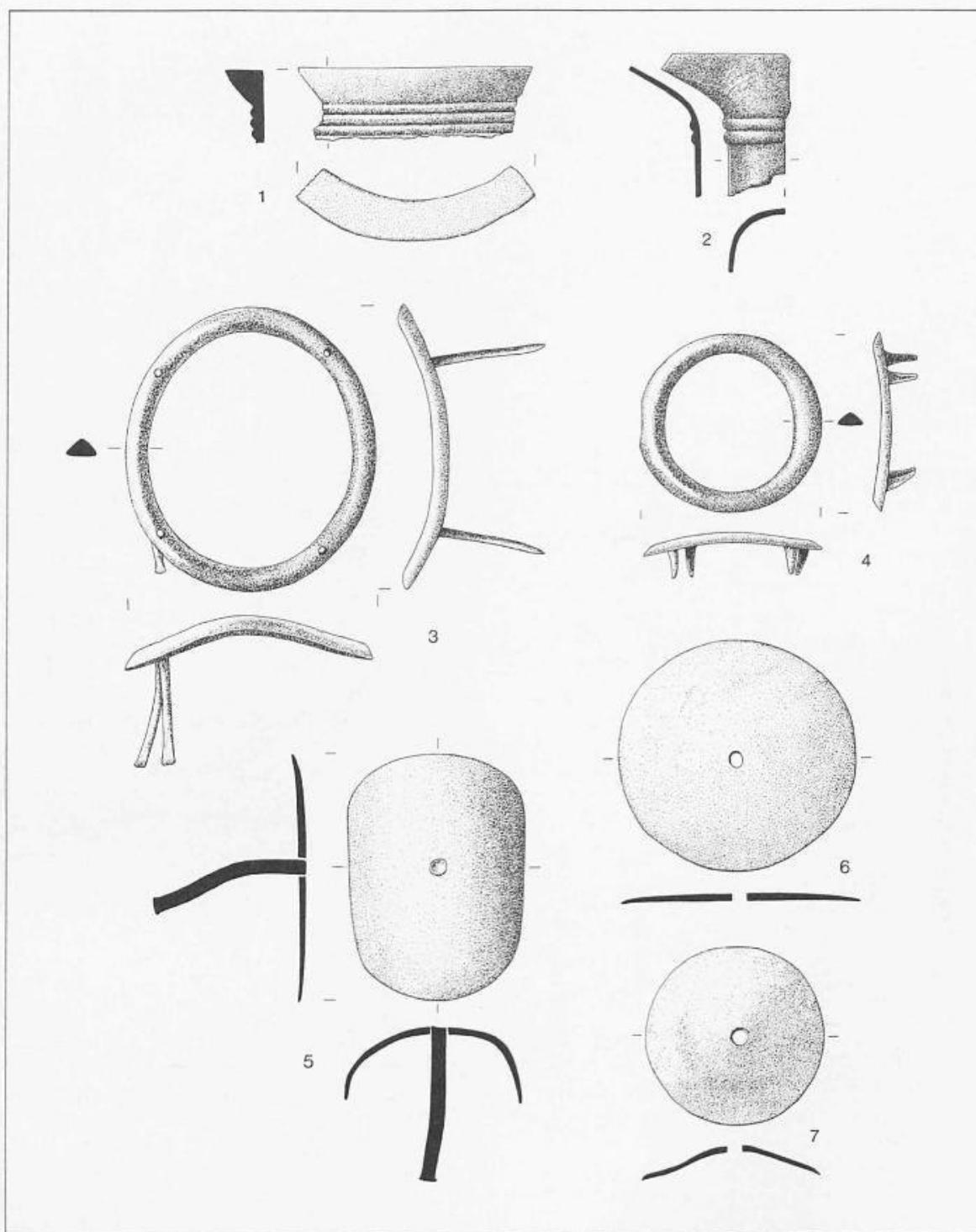


Fig. 41 Neuvy-sur-Barangeon, 'Petit Villatte', dép. Cher: selection of the wagon fittings. — Bronze. — Scale 1:2.

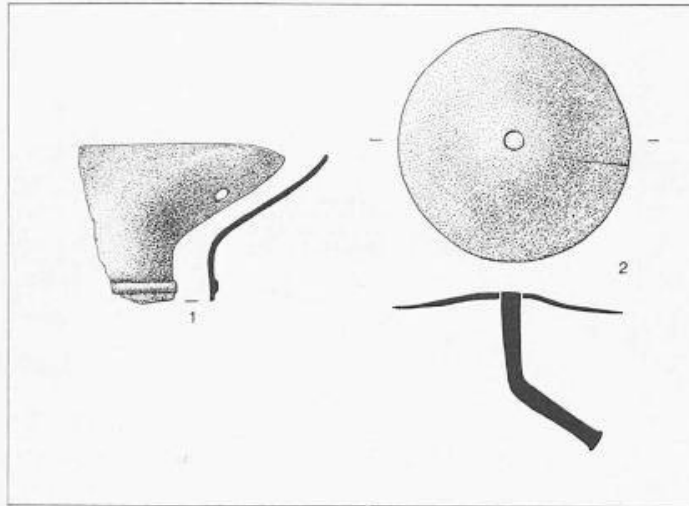


Fig. 42 Choussy, *dép.* Loir-et-Cher: selection of the wagon fittings. — Bronze. — Scale 1:2.

The Wehringen grave enabled us to identify as wagon fittings a number of bronzes from late Urnfield hoards. Furthermore, the excavation of the Wehringen grave showed that the Bad Homburg group of fittings could be used together on the same wagon: nave cylinders, spoke fittings, felloe-clamps and decoration for the felloes (hemispherical knobs) and wagon-box (simple phalerae with central hole; bipartite ornamental discs). The distribution of the wagon fittings of the Bad Homburg group is concentrated in Western Europe (Fig. 22).

In contrast to the wheels of the Coulon group, which were made completely of bronze apart from the wooden felloe segments and the nave lining, the Bad Homburg fittings clearly served as furnishings for wooden wheels. Nevertheless the fittings of the Bad Homburg group are closely related to the Coulon wheels, particularly in their decoration and nave form. The wheels of the two groups must have looked especially similar in those cases in which the wooden wheels had cast bronze spoke fittings, for example from Choussy, Neuville-sur-Barangeon and Vénat (Figs 41, 2; 42, 1; 43, 3).

Concerning the reconstruction of the wagons with fittings of the Bad Homburg group, we must again have recourse to the Wehringen find. In this case the wagon had four wheels and was exceptionally short (wheel base 1.1 m) and wide (wheel gauge 1.4 m).⁹ The rear end of the Wehringen wagon was clearly provided with a bronze-clad wooden structure, decorated with bipartite ornamental discs. Sadly, the surviving felloe fragments do not allow certainty about their construction. The two fragments seem to have curved wood grain, but a felloe bent from a single piece of wood seems to be precluded by the type of wood, oak, which would be unsuitable. As for the wagon from Bad Homburg, it seems probable that the

wheels had riveted felloe-clamps both at the ends of, and between the spokes (Fig. 39). A similar method of holding together the felloe, with rivets, can also be seen on the bronze wheels from La Côte-Saint-André (Fig. 35, 2) and Fa (Lindenschmit 1881, Heft IV, pl. 1, 2). This raises the question whether the finds from Bad Homburg likewise indicate a complex felloe construction with an inner, possibly bent board and an outer felloe composed of several plank segments. If that were true then the late Urnfield felloes of the Coulon and Bad Homburg groups might represent predecessors for the so-called Großebstadt felloes of the Hallstatt period. Perhaps this type of felloe construction had a long history in Central Europe, possibly even documented by the incised decoration on the Tobøl model wheel¹⁰ (Fig. 20). However, it is uncertain to what extent the constructional details documented by the Wehringen and Bad Homburg finds can be generalised for the whole Bad Homburg group.

The fittings of the Bad Homburg group are very well dated by their associated finds. The hoards all date to the late Urnfield period (Ha B3). The only later find is the grave from Wehringen, for which a date in the Hallstatt period is certain. Thus the wheels of the Coulon group and the fittings of the Bad Homburg group seem to be dated to exactly the same chronological span, and have similar distributions. Because the distributions of these finds includes areas of West Europe in which wagon fittings are unknown from earlier periods, the question arises as to the origin of these wagon-making traditions. A continuous tradition of bronze wheels through the Urnfield period can hardly be accepted, with the wheel fragment from the Cannes-Écluse hoard representing the only West European predecessor for the Coulon group. Late Urnfield parallels from Central and Eastern Europe

⁹ Compare the measurements of the rest of the wagons of the Hallstatt period, with wheel gauges between 0.9 and 1.3 m and wheel bases between 1.4 and 1.9 m. See below, Ch. 9.6 and Fig. 96.

¹⁰ But note the different arguments of Kossack 1971.

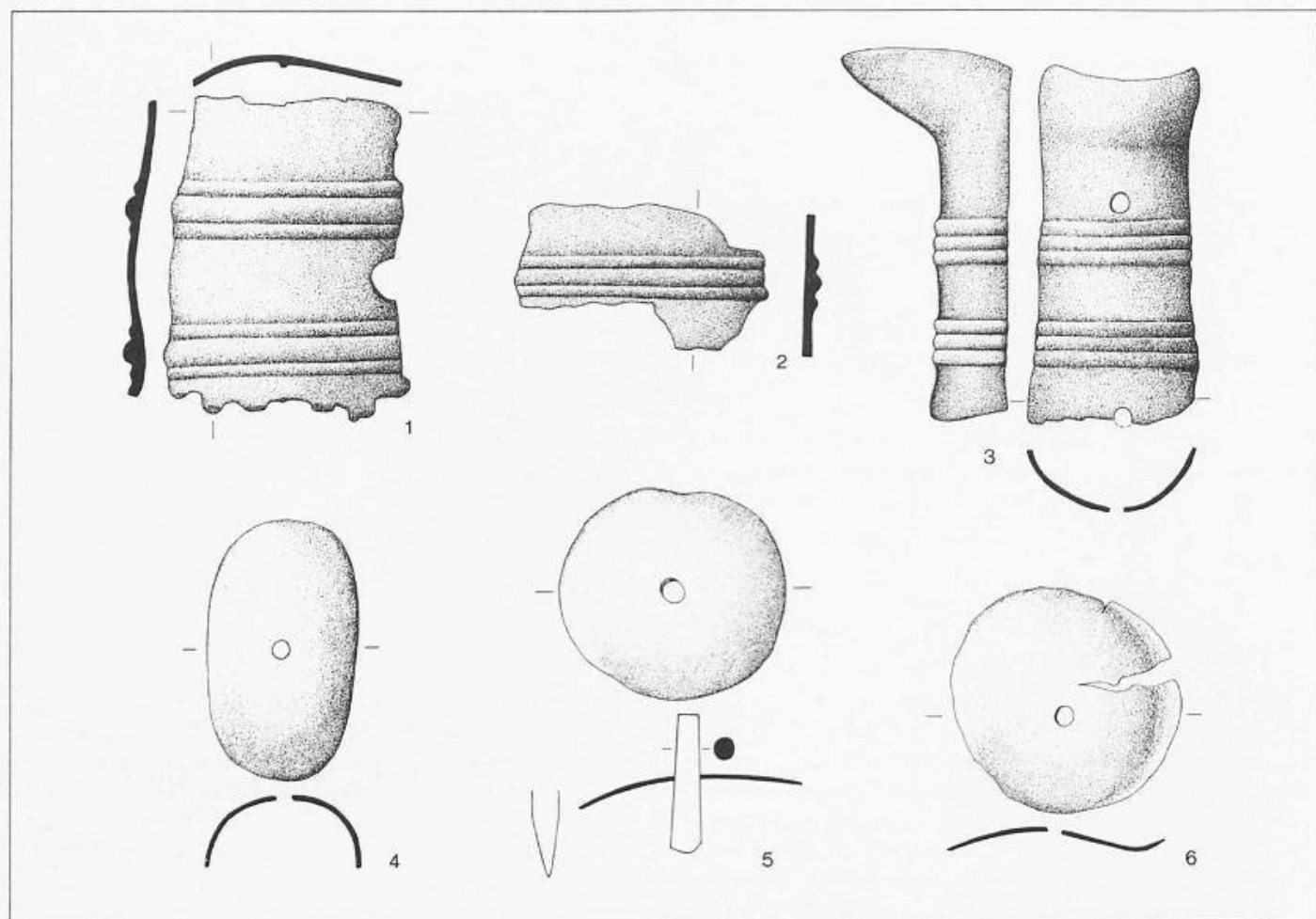


Fig. 43 Vénat, dép. Charente: selection of the wagon fittings (after Coffyn et al. 1981). – Bronze. – Scale 1:2.

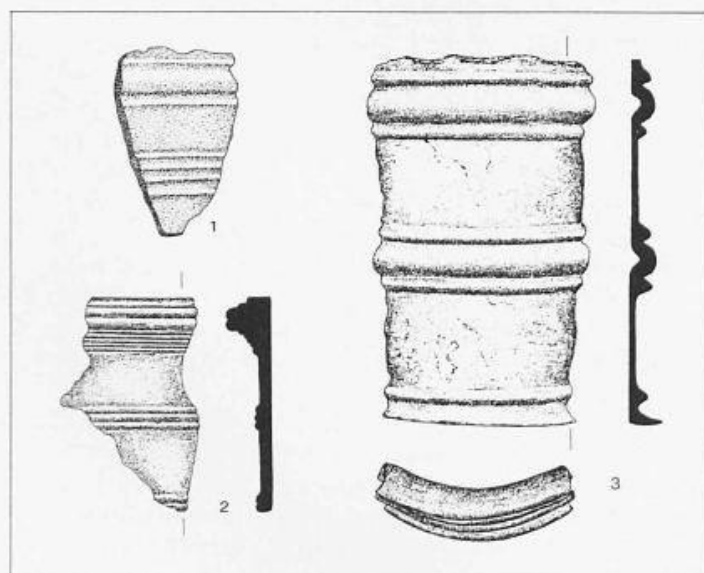


Fig. 44 Fragments of cast bronze nave cylinders: 1 Launac, dép. Hérault; 2 Saarlouis, Kr. Saarlouis; 3 'Western Europe' (1 after Cazalis de Fondouce 1900; 2 after Kolling 1968). – Bronze. – Scale 1:2.

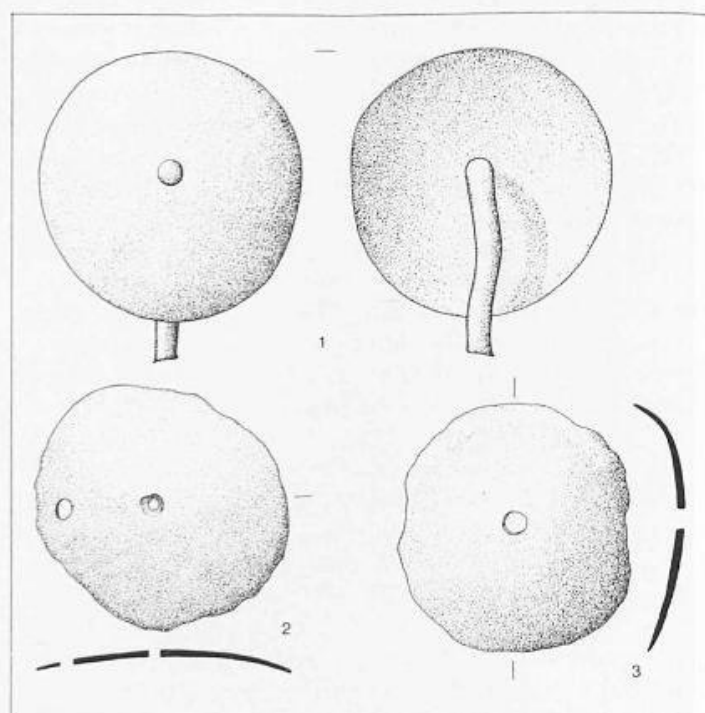


Fig. 45 Cast bronze phalerae with central perforation: 1 Azay-le-Rideau, dép. Indre-et-Loire; 2–3 Notre Dame-d'Or, dép. Vienne (1 after Cordier et al. 1959; 2–3 after Pautreau 1979). – Bronze. – Scale 1:2.

are likewise unknown. Certain similarities with the naves of the Tarcal group, in particular those from Gîrbău and Nádudvar-Halomzug (Fig. 28, 3) which, however, are not later than the Rohod-Szentes phase of the Urnfield period, possibly suggest influence from Central Europe. The naves from Gîrbău and Nádudvar-Halomzug are decorated with groups of three or four grooves, which are comparable to the ribbed decoration of the fittings from Wehringen (Pl. 95B) and Weinheim-Nächstenbach (Fig. 40, 1). The arched groove decoration on the semicircular spoke apertures of the two Carpathian naves find parallels further west, on the wheel from Cortaillod, albeit now executed with ribs.

Furthermore, it should not be forgotten that the West European wheels could have been related to those of the Egemose group. However, because metallic wheel fittings have not survived from the latter group, this remains conjectural.

3.7 MISCELLANEOUS WAGON FITTINGS

Wagon fittings which cannot be assigned to the above six groups come from 10 different finds.

- 1) Alba Julia (formerly Gyulafehérvár): Mozsolics 1977, 165, fig. 1. (Figs 22, 57; 46)
- 2) Archiud, jud. Bistrița-Năsăud: Petrescu-Dimbovița 1978, pl. 225B. (Fig. 22, 59)
- 3) Bobrovčok (formerly Komjatná), okr. Liptovský Mikuláš: Novotná 1970, pl. 28. (Fig. 22, 45)
- 4) Heathery Burn Cave, County Durham: Britton and Longworth 1968, nos 50–57. (Fig. 22, 4)
- 5) 'Hungary': Mozsolics 1977, pl. 8.
- 6) 'Hungary': fragmentary linchpin similar to that from Bobrovčok, Hampel 1887, pl. 56, 2.
- 7) Seinsheim, 'Bullenheimer Berg', Kreis Kitzingen: Diemer 1985, 59, fig. 3, 2. (Fig. 22, 36)
- 8) Tisza-Szent-Imre, Kom. Szolnok: Kemenczei 1984, pl. 210, 17.19. (Fig. 22, 50)
- 9) Trenčianske Bohuslavice, okr. Trenčín: Novotná 1970, pl. 15. (Fig. 22, 43)
- 10) Vurpăr, jud. Alba: Petrescu-Dimbovița 1978, pl. 249C, 4–5. (Fig. 22, 56)
- 11) Drslavice, okr. Uherské Hradiště, Moravia, Hoard II: bronze fragment, possibly from a nave. Říhovský 1972, 35; pl. 37, 13. (Not on Fig. 22)

These finds could represent the remnants of further typological traditions which, simply due to adverse practices of deposition, have hardly survived in the archaeological record. The four axle-caps with bird-shaped linchpins from the Bullenheimer Berg are worthy of special mention. Because they were buried alone they are difficult to date, but the neighbouring hoards on this

¹¹ The three protomes from the Saarbrücken area were not attached by sockets, but instead cast onto iron rods. These were certainly originally used as table-legs (compare Kolling 1968, pl. 64 with Gentili 1987, 237, fig. 158). Apart from the examples listed in Ch. 3.3–4, there are seven finds of socketed protomes:

- 1 Clermont-Ferrand, dép. Puy-de-Dôme: Déchelette 1910, 448, fig. 187, 2.
- 2 Hahnefeld, Kreis Oschatz: Coblenz 1976.
- 3 Heegermühle, Kreis Eberswalde: Schuchhardt 1914, 12, fig. 5.

- 4 Pécs-Jakabhegy: Török 1950, pl. 6.

- 5 Radujevac, Serbia: Vinski 1955, 38, fig. 29.

- 6 Svijany, okr. Ternov: Richlý 1894, pl. 38.

- 7 Zsujta, Kom. Borsod-Abaúj-Zemplén: Hampel 1887, pl. 57



Fig. 46 Bronze Linchpin from Alba Julia, Romania (after Mozsolics 1977). – Scale 1:2.

hillfort are securely dated to Ha B3, suggesting the same date for the four axle-caps. The bronze nave-rings from Vurpăr, Archiud, Tisza-Szent-Imre and the Heathery Burn Cave are also of interest, and they all belong to the younger or later phase of the Urnfield period. But despite the close distribution of Vurpăr, Archiud and Tisza-Szent-Imre in the eastern part of the Carpathian Basin, and their similar dating, their simple form does not justify the creation of a further typological group. The cast bronze linchpins with heads in the shape of an openwork 'birdcage' from Alba Julia (Fig. 46) and 'Hungary', the latter associated with a simple bronze axle-cap, were also probably made late in the Urnfield period. These could be regarded as another typological group, but because only two examples are known, their importance is difficult to judge.

Sockets with waterbird or horned waterbird protomes are likewise difficult to interpret, because it is quite uncertain which, if any, were fitted to wagons.¹¹ However, protomes of this sort adorned the wagons of the Egemose group. If, as seems quite likely, the protomes from Svijany and Zsujta were wagon fittings, then their wagons may have resembled the model from Orăștie (Fig. 125), which is heavily laden with ornithomorphic protomes.

3.8 CONCLUSIONS

As we remarked at the start of this chapter, our knowledge of the wagons of the Urnfield period is chiefly dependent on depositional practices. Grave finds, which provided a rich source of information on the various wagon fittings, and even on the harness of the draught horses, are limited geographically to the area north of the Alps and chronologically to a relatively short horizon in the earlier part of the period. Hoard finds represent depositional customs which are hardly understood today: in some areas the quantity of wagon finds seems to be almost directly proportional to the size and number of hoards. Thus many wagon fittings come from the rich hoard horizon of the later Urnfield period in West Europe, or from the even richer hoards of the earlier Urnfield period in the Carpathian Basin. For this reason we must reckon with the possibility that many wagon fittings have not survived, merely because in certain regions at certain times there was no custom of ritual deposition and bronze scrap was not collected in large hoards. Our knowledge is also obstructed by the unaccompanied deposition of wagon components, which was not infrequent and was presumably practised for reasons of cult (for example Obišovce, Arcalieu, Skjerne, Eggenhofen, Fa, Coulon, Haßloch, Stade and Seinsheim 'Bullenheimer Berg'). Moreover, in Central European conditions it is almost always only the metallic wagon fittings which survive: wooden remains are represented very rarely in the archaeological record. The tripartite wheel from the 'Wasserburg' near Buchau (Piggott 1983, 107, fig. 59) and the plank segment of a felloe from the Barnstorfer Moor, Niedersachsen, with a calibrated ^{14}C age determination of ca. 1100 BC (Hayen 1978), are notable exceptions. It is therefore very difficult to compare our elaborate ceremonial wagons with the contemporary simple wooden vehicles, which surely must also have existed.

After the horizon of Aegean influence in the Middle Bronze Age and at the start of the Urnfield period, which we can detect both in the symbolic content of the wagons (see Ch. 12.1) and in their construction (the introduction of chariots; the thickened spokes of the wheels from Obišovce and Hart a. d. Alz etc.) the tradition of ceremonial wagon construction continued independently in Central Europe, as the development of various local types of fittings (Figs 22; 107), and the emergence of the Urnfield symbol complex show.

The possibilities of understanding the wagons simply from a study of their bronze fittings are rather limited. I believe that the bronze furnishings show the existence of a

special tradition of wagon construction and use, which was quite distinct from the normal wooden vehicles which were used for day to day tasks in agriculture and for general transport. The horned waterbird protomes of the Eggenhofen group, and the socketed waterbird protomes which may likewise have been fitted to wagons (e.g. from Svijany, Zsujta etc.), could speak for a function in the realm of cult or magic – compare, for example, the similarly decorated wagon models and the depictions of wagons with ornithomorphic protomes (e.g. Figs 121; 124, 1; 125–6; 153). The elaborate construction of the wagons, with their rich cast bronze fittings, certainly show them to have been objects of display and pomp, whereby a use in cult or as a sign of rank or status are both possible (see the discussion in Ch. 12.1–2).

When we attempt to form an impression of the original appearance of the wagons, the limits of our knowledge immediately become apparent. Nevertheless, a number of finds indicate that the vehicles had four spoked wheels: the four axle-caps from Seinsheim, 'Bullenheimer Berg'; the three axle-caps from Hart a. d. Alz; the eight nave-rings from the Heatherly Burn Cave; the sets of four bronze wheels from La Côte-Saint-André and Stade; the wagon of the Bad Homburg group from Wehringen. The wagon from Hart a. d. Alz not only had large caps for the wheel axles, but also smaller caps which certainly came from the axle of its draught pole, which allowed the pole to be moved in a vertical direction (Müller-Karpe 1956, 64, fig. 6, 3; for Hallstatt parallels see Ch. 9.4). The small caps from Skjerne (Fig. 32, 1) and Rohov (Jacob-Friesen 1969, 124, fig. 2, centre) also came from pole axles, which shows that these wagons, too, had four wheels (Ch. 9.4). The tradition of four-wheeled ceremonial wagons is also documented in Western Europe by representations on late Urnfield vessels from Sublaines, dép. Indre-et-Loire (Fig. 149) and Lansargues, dép. Hérault (Nicolas and Martin 1972, 39, fig. 7, 3–4).

At the end of the Urnfield period the picture is dominated by finds from the rich West European hoards, which give much information about wagon construction in this part of Europe (Coulon and Bad Homburg groups). Although the tradition of wagon construction in the *Pfahlbaukreis* (Eggenhofen group) is less well dated, owing to the context of the finds in the West Swiss lake-side settlements, it is probable that this tradition, too, survived till the end of the Urnfield period. A few finds from the Carpathian Basin, including the axle-caps and linchpins from Alba Julia and 'Hungary', also probably belong to a later phase of Ha B (Mozsolics 1977). The other traditions of wagon construction did not survive till the close of the Urnfield period (Fig. 107).

CHAPTER 4

The Hallstatt Wagon: classification of the nails, tyres and felloes

Iron tyres were an innovation in Early Iron Age Central Europe: they were first used in the Hallstatt period and are the most common wagon fittings to have survived in the wagon-graves. On most wagons, each wheel was provided with a tyre which was made from a single piece of forged iron. Sadly, the tyres are often very badly preserved and it is difficult to recognise their original form. On such simple forged iron fittings only a coarse typological classification is possible, but even this is made difficult by corrosion which has often either destroyed much of the tyre, or swollen and deformed it so that the original dimensions and shape are obscured. The tyres were always provided with nails. Holes were punched through the tyres at intervals, and the nails were hammered into the wooden felloe. The nail heads were sometimes countersunk, but often the nail heads projected above the surface of the tyre. The nails often penetrated the whole thickness of the felloe: if the tip of the nail shaft projected through the inside of the felloe, it was simply bent over, to join together the tyre and felloe even more securely.

The iron tyres of the Hallstatt period show a considerable variety, expressed by their width, cross-section and nailing. The narrowest tyres can be as little as 16 mm wide (Hohenfels) and the widest as much as 42 mm in width (Sainte-Colombe, 'La Butte'). The cross-section may be wide and flat, domed, channelled or profiled. The tyre nails have a variety of different heads, including large flat square shapes, long oval and large rectangular examples.

The various nail types will now be described (Fig. 47: types A–G), followed by a description of the tyre types (Fig. 48: types I–VII). For each tyre it has been necessary to judge the results of corrosion and estimate its original cross-section and width. The widths are therefore derived from an average of measurements of the tyres themselves, and the 'idealised' cross-sections shown on Fig. 48 are reconstructed from the fragmentary surviving remains.

4.1 NAILS

Seven nail types have been distinguished:

A: Nails of type A were found in 12 graves, and they may also possibly be represented in one further grave. The nails are characterised by long sausage-shaped heads which projected above the surface of the tyre, thereby forming its true running surface (Fig. 47, A). The nail

heads measure up to 80 mm in length and less than 15 mm in width. The nails are typically uniformly long and thin, but sometimes the nail heads on a single tyre vary considerably in size: the nail heads from Wörl measure 36–49 mm in length (Pls 131B; 132A), and those from Dietfurt vary from 25 to 45 mm in length (Pls 64, 2–3.7–9; 65, 1).

Type A, cat. nos: 57B (Pl. 32D, 1); 99 (Pl. 56A, 3–5); 107B (Pl. 63, 26–28.30.32); 108 (Pls 64, 2–3.7–9; 65, 1); 114A (Pl. 73, 1); 117 (Pl. 75B, 4–5); 125 (Pl. 83A, 10); 126A (Pl. 84A, 6.10–13); 138 (Pl. 89A, 1–3.5); 151D (Pl. 109, 1); 153 (Pl. 117, 1–2.6); 181 (Pls 131B; 132A). Possibly of type A, cat. no.: 115A (Pl. 74B, 3).

B: The nails of type B do not constitute a homogeneous group. They have small rectangular or subrectangular heads which project slightly above the tyre surface (Fig. 47, B).

Type B, cat. nos: 106B (Pl. 62, 8–10); 113/ii (Pl. 72, 3–5); 126B (Pl. 84B); 149 (Pl. 107A, 1).

C: Type C comprises nails from 19 graves, with two further possible examples. The nails have large rectangular heads which project above the surface of the tyre (Fig. 47, C). The nails vary widely in size, with lengths from 27 to 92 mm and widths from 12 to 20 mm. By far the longest nail heads are found on a number of unprovenanced tyre fragments in the Württembergisches Landesmuseum, Stuttgart, with lengths ranging from 68 to 92 mm (cat. no. 98A; Pl. 55A); other long nail heads come from Bitz, Sulz am Neckar and Villingen-Schwenningen, with lengths ranging from 48 to 57 mm (Pls 32A; 50A, 1–2; 52, 3–5). Short nail heads, 30–42 mm long, are seen on tyres from Albstadt-Ebingen, Hügelsheim, Salem tumulus G, Sigmaringen, Uffing tumulus 6, Nymburk and from an unprovenanced find (cat. no. 98B) in the Württembergisches Landesmuseum, Stuttgart (Pls 27A, 1–2.4; 38, 6–7; 47A, 2–3.5; 50B, 1.3; 90C, 4–8; 120, 9). The two uncertain examples of this type of nail were found in graves from Dittenheim and Haldenwang. In these two cases, the tyres were very badly corroded and the original shape of the nail heads is uncertain.

Type C, cat. nos: 11 (see catalogue); 48 (Pl. 27A, 1–2.4); 55 (Pl. 32A); 58 (Pl. 32C); 61 (see catalogue); 68 (Pl. 38, 6–7); 71 (Pl. 40B); 72 (Pl. 41A, 4); 82 (Pl. 44C, 6–7); 84A (Pl. 47A, 2–3.5); 88 (Pl. 50B, 1.3); 92 (Pl. 50A, 1–2); 96 (Pl. 52, 3–5); 98A (Pl. 55A); 98B (Pl. 55B); 141B (Pl. 90C, 2.4–8); 141C (Naue 1887a, pl. 38, 20); 144 (Pl. 94B, 1–3); 157 (Pl. 120, 9). Possibly of type C, cat. nos: 110 (Pl. 69, 4.6–7.9–10); 116 (Pl. 75A, 1–2.7).

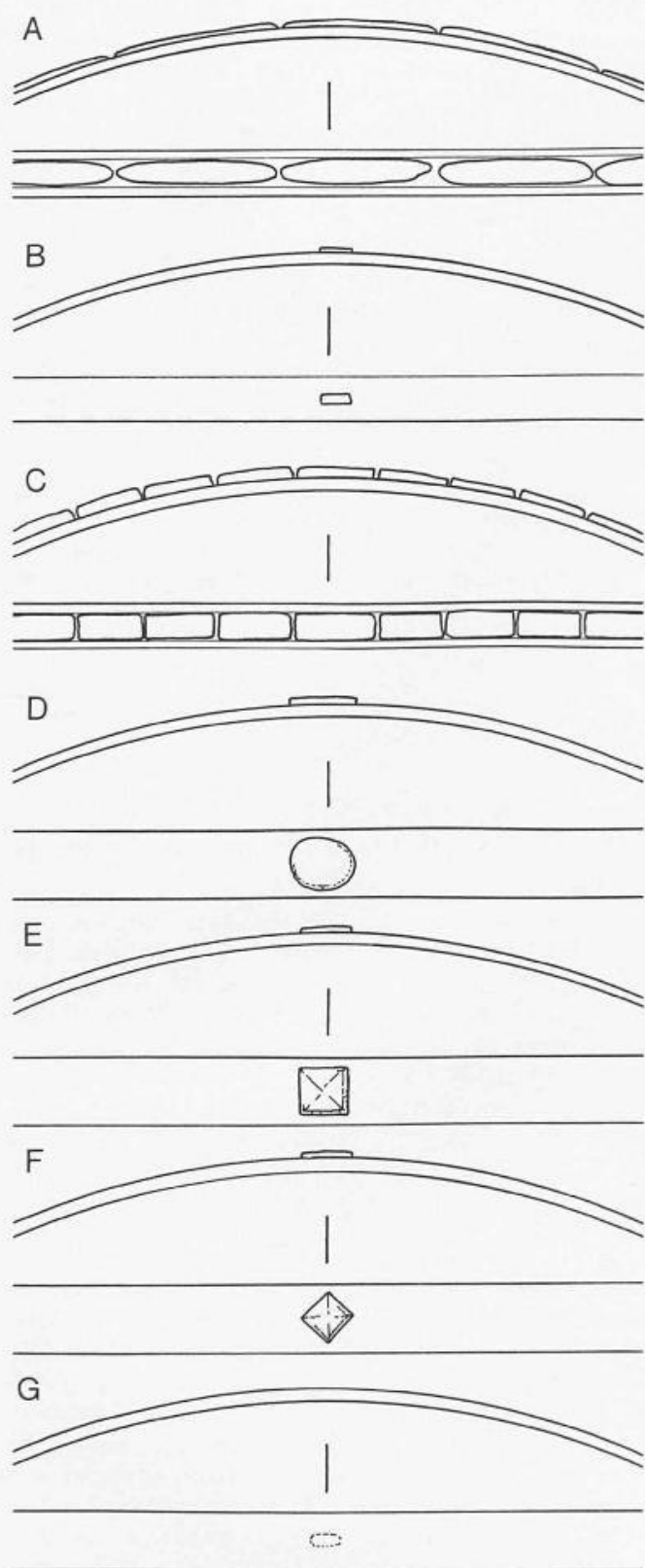


Fig. 47 Diagrammatic representation of nail types A to G.
— Not to scale.

D: Nails of type D have large flat round heads (Fig. 47, D). These are seen on tyres from 17 graves, and in one further grave this type of nail is probable.

Type D, cat. nos: 5 (Pl. 10B, 1.3.5); 10 (Pl. 10C, 1); 13A (see catalogue); 16 (Pl. 15B, 1); 21 (Drack 1958a, 20, fig. 16, 3); 22 (ibid. 1958a, 20, fig. 16, 2); 24 (ibid. 1958a, 21, fig. 17, 16); 25 (ibid. 1958a, 20, fig. 16, 4–5); 26 (ibid. 1958a, 21, fig. 17, 19); 28 (ibid. 1958a, 24, fig. 22, 7–9); 29B (ibid. 1958b, pl. 7, 46–7); 29C (ibid. 1958b, pl. 7, 116); 32 (ibid. 1958a, 20, fig. 16, 1); 40A (Haffner 1976, pl. 5, 3); 40B (ibid. 1976, 193, fig. 44, 2–3); 44 (Engels 1969, pl. 2, 2); 148/i (Pl. 101). Possibly of type D, cat. no.: 19 (Drack 1958a, 21, fig. 17, 12).

E: The nails of type E have large flat square heads, which were positioned with their sides parallel to the edges of the tyre (Fig. 47, E). They are found on tyres from 12 graves, and two further graves may have contained this type of nail.

Type E, cat. nos: 2A (Pl. 6B, 1); 2B (Pl. 7, 3); 8 (Pl. 9B, 1.7–8); 15 (see catalogue); 18 (Drack 1958a, 21, fig. 17, 20); 27 (ibid. 1958a, 21, fig. 17, 13); 103 (Pl. 59, 6–7); 118 (Pl. 77A, 5–7); 123 (Pl. 79B, 5–6); 124 (Pl. 78, 1); 147B (Pl. 98, 15–6); 176A (Pl. 128, 1). Possibly of type E, cat. nos: 51A (Pl. 28B, 1); 59 (unpublished).

F: The nails of type F, like type E, have large flat square heads, but in this case they were positioned with their sides diagonal to the sides of the tyre (Fig. 47, F). This type of nailing is found on the tyres of five wagons.

Type F, cat. nos: 45 (Frohberg 1974, 145, fig. 1); 109 (Pl. 68A, 2); 148/ii (Pl. 103); 148/iii (Pl. 104); 152 (Pl. 115, 8–9).

D–F: In five cases, the original shape of the nail heads is obscured by corrosion, and it is only possible to recognise their large flat form. The nail heads were probably round or square in shape, and would have belonged to types D, E or F.

Types D, E, or F, cat. nos: 39 (Dehn 1941, 89, fig. 51, 5); 51B (see catalogue); 64A (Pl. 35A, 3–4); 111 (Pl. 70B, 1); 137 (Pl. 88A, 1).

G: Type G includes nails with heads countersunk into the surface of the tyre. This type of nail has been recognised on the tyres of 26 wagons (Fig. 47, G). The nail holes on these tyres must have been widened at the top to accommodate the countersunk nail heads. Owing to corrosion, the shape of the nail heads is hardly ever visible, and X-ray examination would be necessary to understand the details of this type of nailing.

Type G, cat. nos: 13B (Pl. 18, 20); 14 (see catalogue); 17 (see catalogue); 49 (see catalogue); 62 (Pl. 34, 1); 74A (Pl. 41C, 4–5); 76 (Pl. 43A, 1); 77 (unpublished); 83 (Pl. 46B, 1–2); 97 (Pl. 53, 2); 100 (Pl. 57, 6.13); 104 (Pl. 60B, 1); 105 (Pl. 61, 1–2); 106A (Pl. 62, 5); 112A (Pl. 71A, 3); 113/i (Pl. 72, 1); 119 (Pl. 79A, 2–3); 120 (Pl. 77B, 4–5); 132 (Pl. 87A, 3–4); 143 (Pl. 94A); 151E (Pl. 110, 1.3); 151I (Pl. 112B, 3–4); 164 (Pl. 122B, 1.6); 173 (Pl. 127E); 177 (unpublished); 182 (see catalogue).

On some tyres, corrosion obscures the original appearance of the nail heads. For example, the globular nail heads on the tyre fragments from Aglasterhausen-

Breitenbronn could be rusty concretions over nail heads which were originally countersunk (Pl. 26, 1.3–4.9). Likewise, the nail heads on the tyre fragments from Ohnenheim only survive as globular concretions, and their original shape is uncertain (Pl. 10E, 1–3). On some tyres, however, the nailing is quite unique. For example, the tyres from Uttendorf tumulus 5 had long thin nail heads set transversely (Pl. 130A, 1.4). The nailing on the tyres from Weinsfeld is equally untypical, with large-headed nails of type E as well as small round-headed nails: these are the only tyres with two sorts of tyre nail (Pl. 77A, 5–7).

4.2 TYRES

Seven types of tyre can be distinguished (Fig. 48, types I–VII). While the tyres are generally classified according to their cross-section, types I and V are primarily typified by their very characteristic nailing (e.g. Fig. 47, A and C).

I: Twelve tyres can be assigned to type I, and one further candidate is uncertain. Type I is characterised by closely spaced nails of type A (Fig. 48, I). The tyres themselves show a certain variety in cross-section, although they are all narrow, measuring 20–25 mm in width. Seven of the tyres have a narrow groove on their outer side, to accommodate the nail heads. Two of the tyres, from Lhotka and Großebstadt, cemetery I, grave 1 have an elaborate beaded profile (Fig. 48, 114A.153). Subtype Ia includes six tyres, which are characterised by the absence of lips on the edges of their inner surfaces. This group of tyres is relatively uniform, all being provided with an external groove, and all being narrow (20–23 mm wide). Subtype Ib includes five tyres which have lips on the edges of their inner sides. The cross-sections of these tyres are not very uniform, and they also show a relatively wide range of widths (20–25 mm wide).

Type Ia, cat. nos: 107B (Pl. 63, 26.28.30); 114A (Pl. 73, 1); 126A (Pl. 84A, 6.10–13); 138 (Pl. 89A, 1–3.5); 151D (Pl. 109, 1); 153 (Pl. 117, 1–2.6). Type Ib, cat. nos: 99 (Pl. 56A, 3–5); 108 (Pls 64, 2–3.7–9.11; 65, 1); 117 (Pl. 75B, 4–5); 125 (Pl. 83A, 3–4.6.9–11); 181 (Pls 131B; 132A). Type I, cat. no.: 57B (Pl. 32D, 1). Possibly of type I, cat. no.: 115A (Pl. 74B, 3).

II: Sixteen tyres can be assigned to this type. They are characterised by a simple angular profile and long lips forming the sides of the inner surface of the tyre (Fig. 48, II). All but one of the tyres have a width between 20 and 27 mm; the tyres from Asperg are exceptional, measuring 35 mm in width (Fig. 48, 52).

Type II, cat. nos: 21 (Drack 1958a, 20, fig. 16, 3); 29B (ibid. 1958b, pl. 7, 46–47); 47 (Pl. 26, 1–6); 52 (Pl. 30, 1–2); 67 (Pl. 37D); 93D (Pl. 51B, 3–4); 93E (Pl. 51C, 2–4); 100 (Pl. 57, 6.13); 102 (Pl. 58A, 1–3.6–7); 106B (Pl. 62, 1.4.8–10); 110 (Pl. 69, 4.6–7.9–10); 113 (Pl. 72, 1.3–5); 116 (Pl. 75A, 1–2); 149 (Pl. 107A, 1); 163 (Pl. 122A, 1.7); 168B (Pl. 125B, 3–5).

III: Eleven tyres can be assigned to type III. They are characterised by a domed, almost semicircular cross-section, and small lips on either edge of their inner surface

(Fig. 48, III). These tyres are narrow, with widths ranging from 16 to 24 mm. The original cross-section of one tyre, from Winterlingen, is difficult to reconstruct because the tyre cross-sections from this grave show a considerable variety, and suggest that the Winterlingen tyres have become mixed with tyres from another grave, probably from Erkenbrechtsweiler (Fig. 48, 97). However, the tyres from Winterlingen and Erkenbrechtsweiler seem both to have been of type III (Pls 34, 1; 53, 2).

Type III, cat. nos: 12 (Pl. 10E, 1–3); 49 (unpublished); 62 (Pl. 34, 1); 77 (see catalogue); 97 (Pl. 53, 2); 112A (Pl. 71A, 3); 119 (Pl. 79A, 2); 120 (Pl. 77B, 4–5.7); 126B (Pl. 84B); 132 (Pl. 87A, 3–4); 151E (Pl. 110, 1.3).

IV: Only four tyres can be assigned to this type. The cross-sections are similar to those of type III, but in type IV they are wider and only slightly domed (Fig. 48, IV). The tyres always have lips along the edges of their inner sides, and measure 24–28 mm in width.

Type IV, cat. nos: 76 (Pl. 43A, 1); 83 (Pl. 46B, 1–2); 104 (Pl. 60B, 1); 112B (Pl. 71B, 1–7).

V: Nineteen tyres can be assigned to type V. These tyres are characterised by large rectangular nail heads of type C which were set so closely that they touched and formed the true running surface of the tyre. The cross-sections of the tyres themselves are quite variable, and range in width from 19 to 27 mm (Fig. 48, V). The tyres often have lips along the edges of their outer surfaces, forming a groove to accommodate the close-set nail heads. Most of the tyres also have lips along the edges of their inner surfaces, but these are absent on three examples (Fig. 48, 92.96.98B).

Type V, cat. nos: 11 (unpublished); 48 (Pl. 27A, 1–2.4); 55 (Pl. 32A); 58 (Pl. 32C); 61 (see catalogue); 68 (Pl. 38, 6–7); 71 (Pl. 40B); 72 (Pl. 41A, 4); 82 (Pl. 44C, 6–7); 84A (Pl. 47A, 2–3.5); 88 (Pl. 50B, 1.3); 92 (Pl. 50A, 1–2); 96 (Pl. 52, 3–5); 98A (Pl. 55A); 98B (Pl. 55B); 141B (Pl. 90C, 2.4–8); 141C (Naue 1887a, pl. 38, 20); 144 (Pl. 94B, 1–3); 157 (Pl. 120, 9).

VI: The tyres of types VI and VII are characterised by their wide flat cross-sections (Fig. 48, VI–VII). Type VI tyres have widths measuring between 22 and 27 mm, and always have lips along the edges of their inner surfaces. Thirteen tyres may be assigned to this type, and two more tyres possibly belong.

Type VI, cat. nos: 5 (Pl. 10B, 5); 8 (Pl. 9B, 8); 10 (Pl. 10C, 1); 14 (Pl. 20A, 4); 26 (Drack 1958a, 21, fig. 17, 19); 27 (ibid. 1958a, 21, fig. 17, 13); 28 (ibid. 1958a, 24, fig. 22, 7–9); 34 (ibid. 1958a, 21, fig. 17, 17–18); 40B (Haffner 1976, pl. 5, 3); 44 (Engels 1969, pl. 2, 2); 65 (Pl. 37B, 1); 80 (Pl. 44B, 1–2); 173 (Pl. 127E). Possibly of type VI, cat. nos: 32 (Drack 1958a, 20, fig. 16, 1); 89C (Pl. 50C, 8).

VII: Type VII tyres are characterised by a flat cross-section similar to type VI, but type VII tyres are wider, measuring 28–42 mm in width (Fig. 48, VII). Type VII is the most common of the tyre types, including examples from 44 wagons. Most of the tyre cross-sections have a fairly uniform flat shape with lips along the edges of their inner surfaces. However, on two tyres the lips are lacking

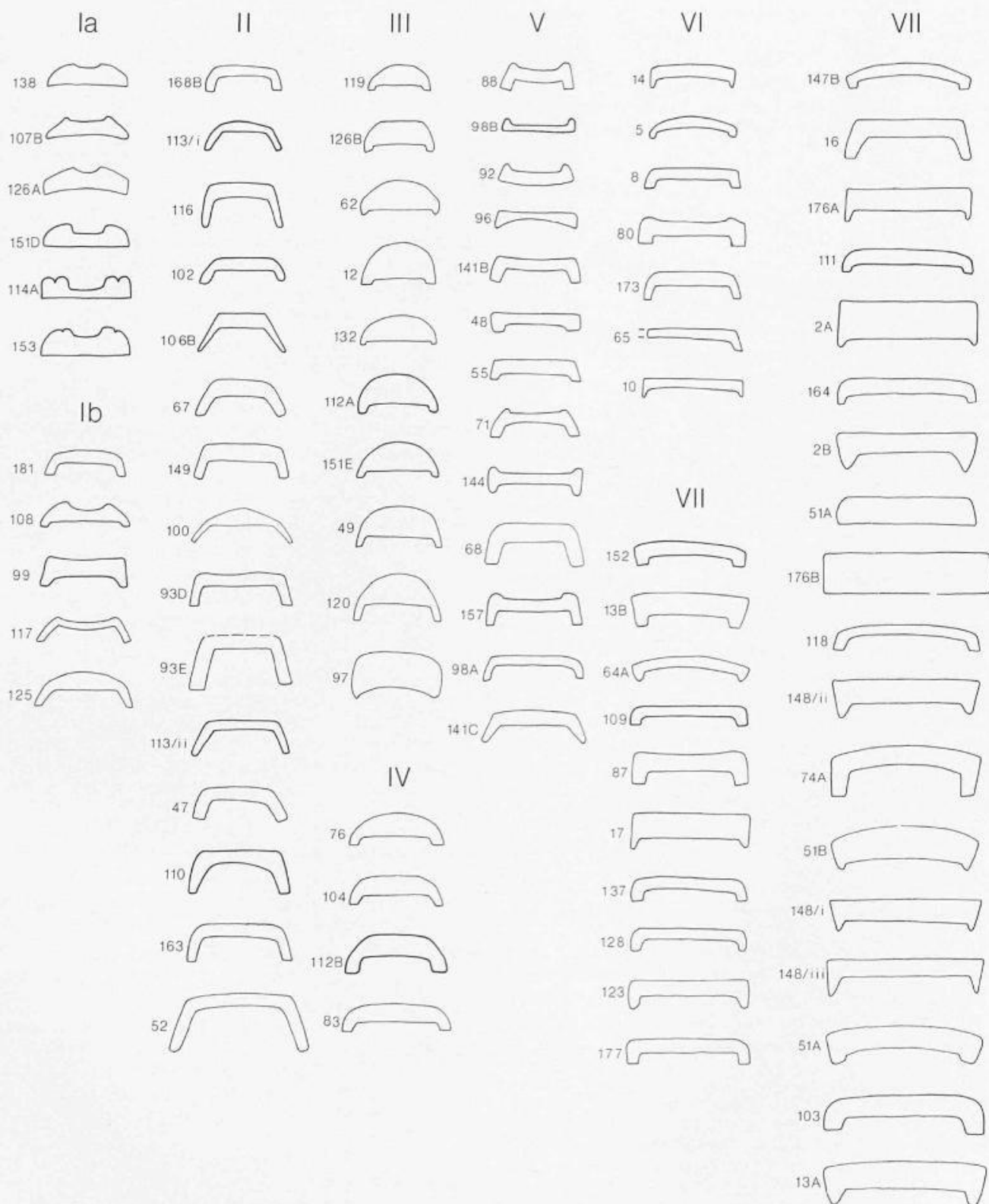


Fig. 48 Idealised cross-sections of iron tyres of types I to VII. — Scale 2:3.

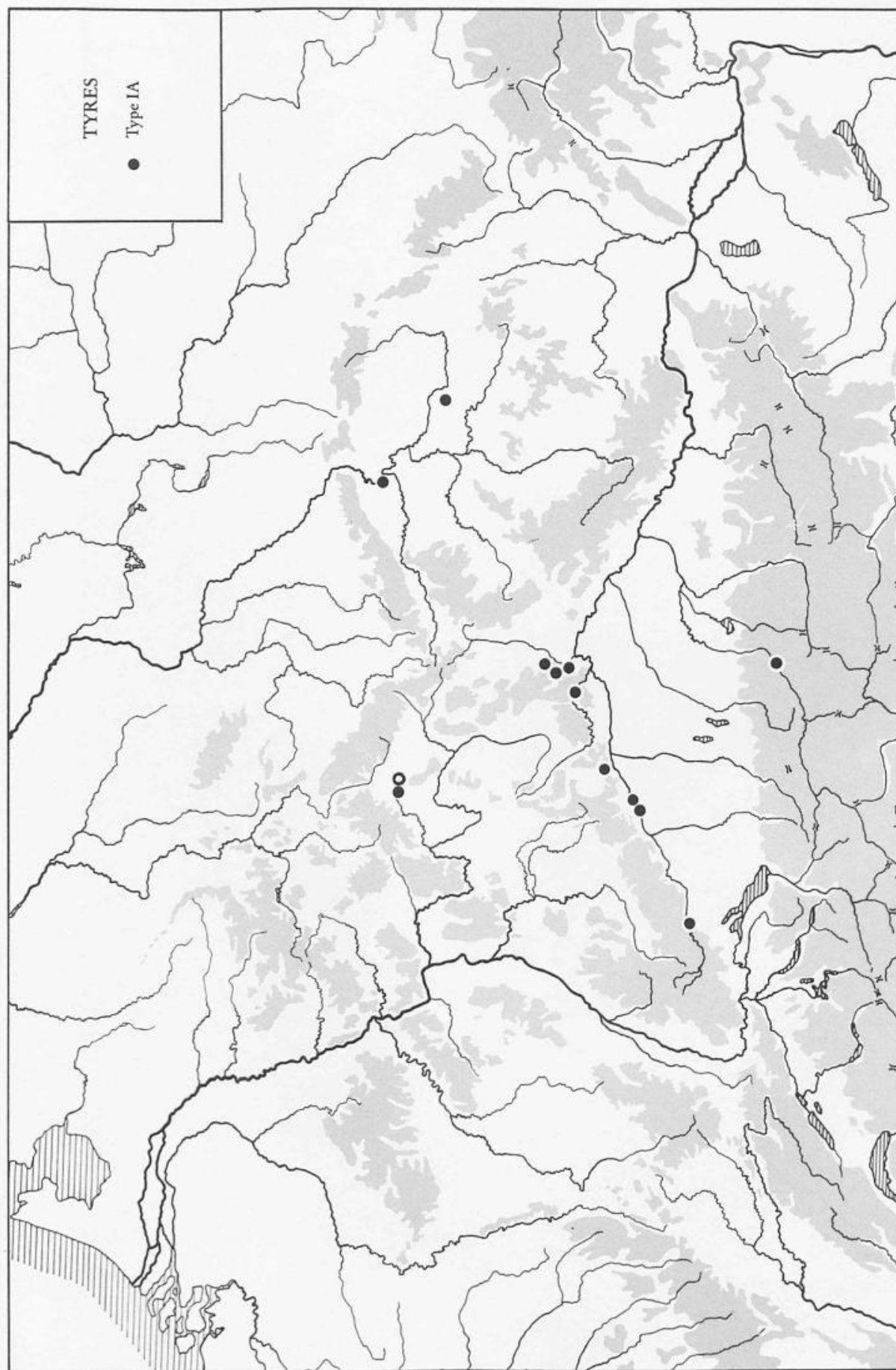


Fig. 49 The distribution of tyres of type IA.

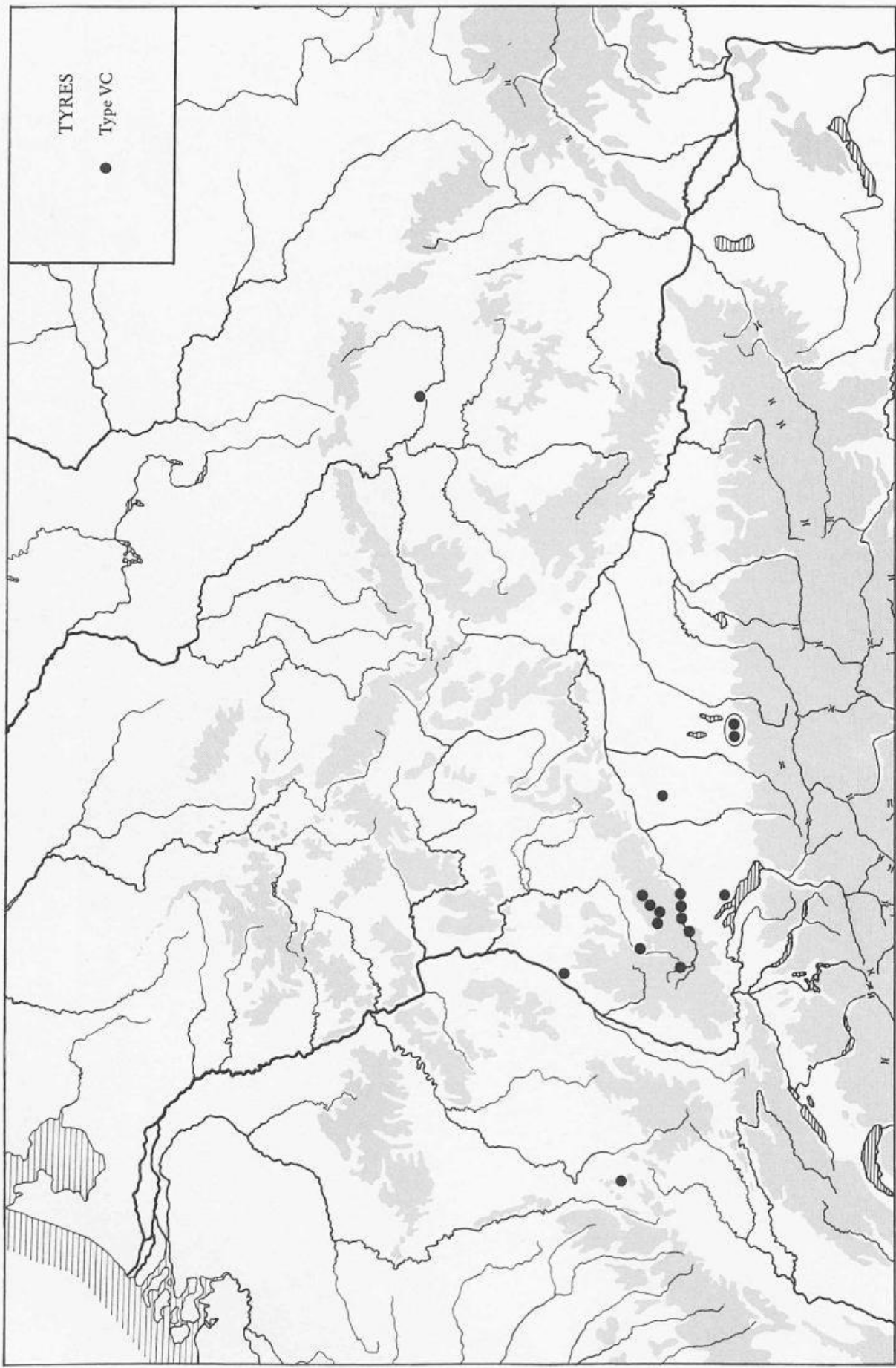


Fig. 50 The distribution of tyres of type VC.

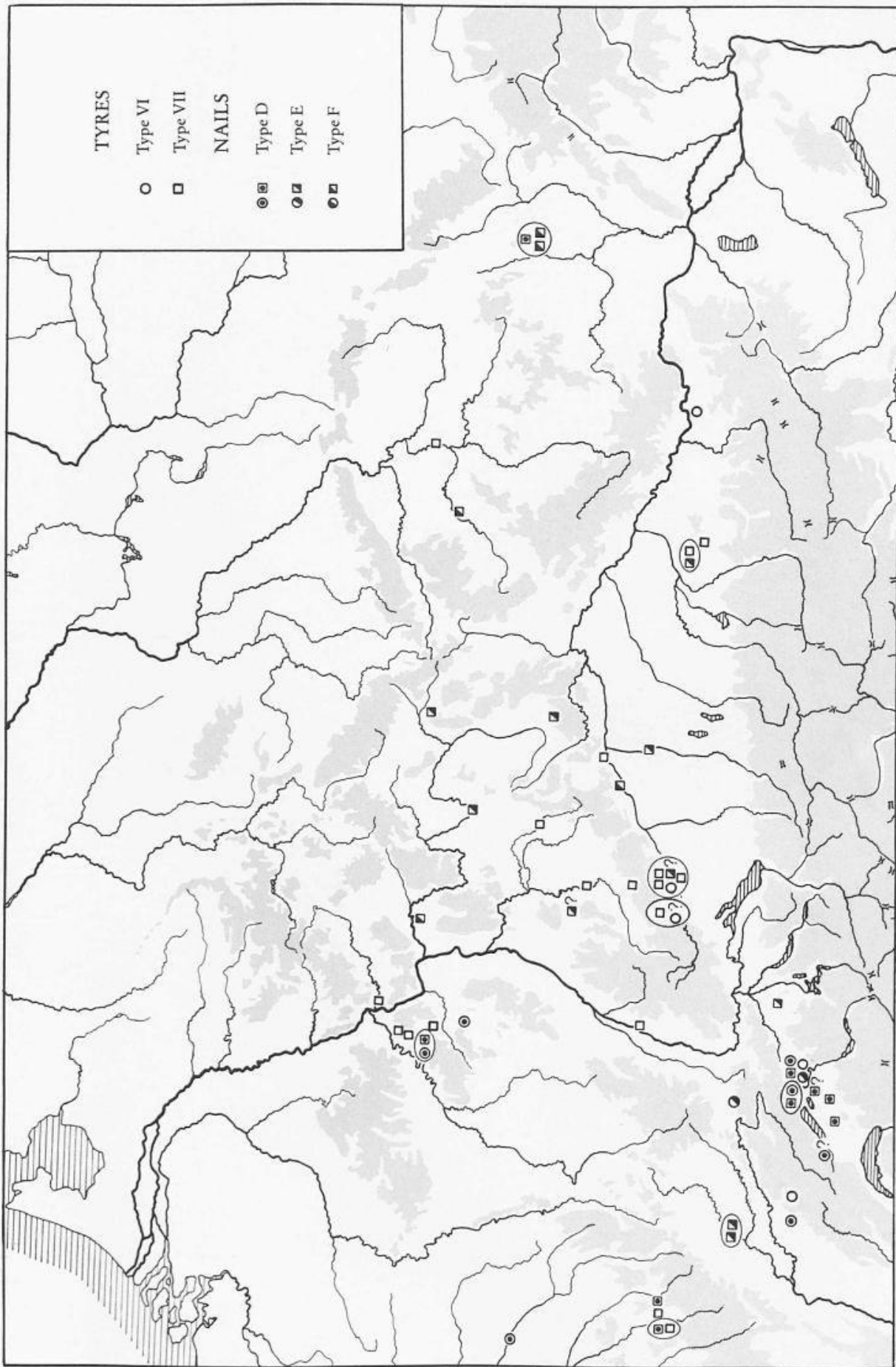


Fig. 51 The distribution of types VI and VII, and of nails of types D, E and F.

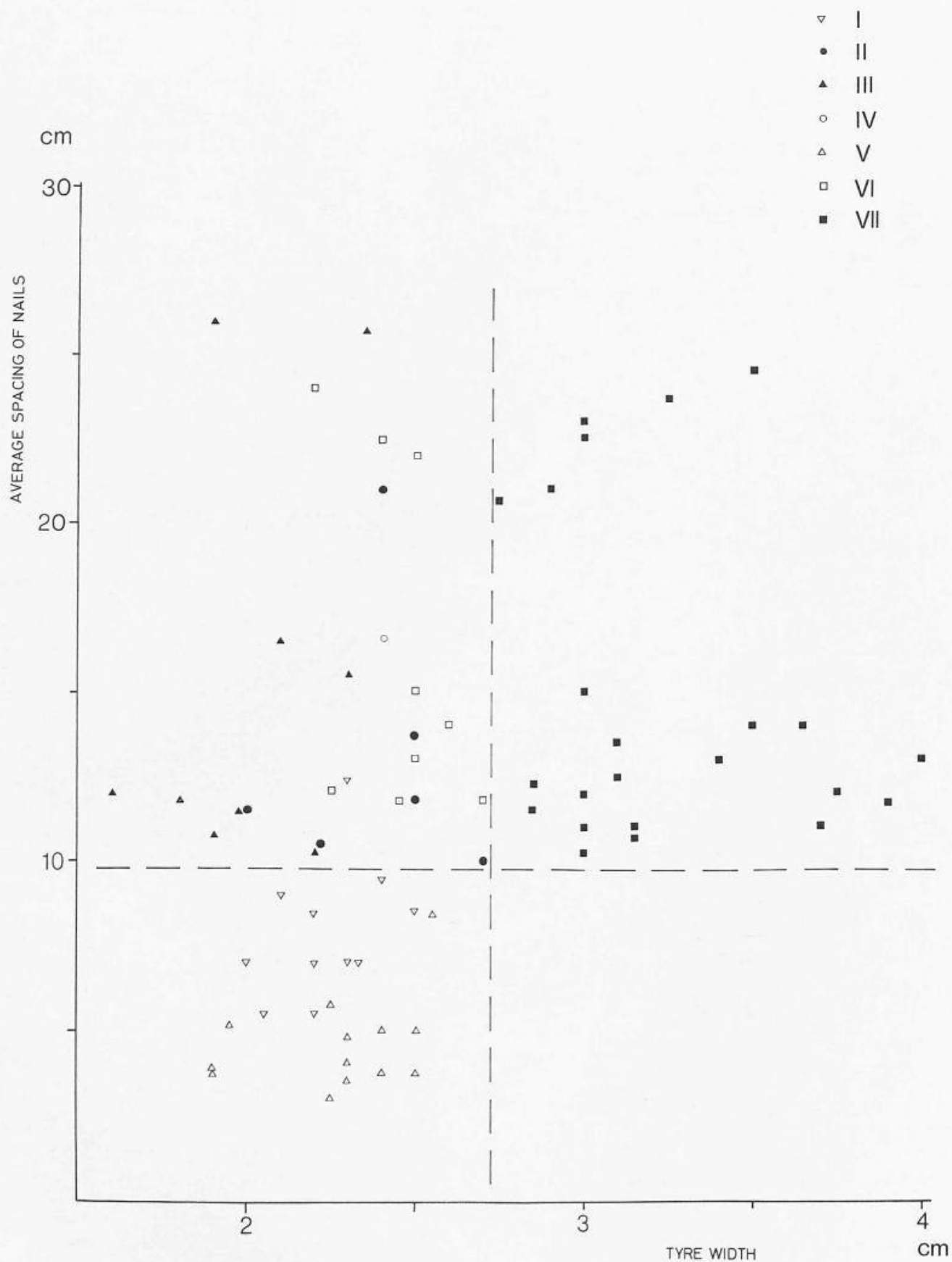


Fig. 52 Graph comparing the widths and nailing of the iron tyres of the Hallstatt period.

(Fig. 48, 51A.176B), and the tyres vary greatly in thickness. For example, from Hundersingen, tumulus I, secondary grave 1, Görau tumulus 3 and Donauwörth come relatively lightly made tyres (Fig. 48, 64A.147B.111), whereas from Vix, Apremont grave 1, Uttendorf tumulus 5 and 'Hohmichele' grave VI the tyres have very heavy cross-sections (Fig. 48, 2A.17.51B.176B). Although the tyres of type VII show a considerable variety, particularly in the thickness of their cross-sections, it does not seem justified to divide them into subtypes.

Type VII, cat. nos: 2A (Pl. 6B, 1); 2B (Pl. 7, 3); 13A (Pl. 16, 14); 13B (Pl. 18, 20); 16 (Pl. 15B, 1); 17 (Egg and France-Lanord 1987, 152, fig. 5); 18 (Drack 1958a, 21, fig. 17, 20); 19 (ibid. 1958a, 21, fig. 17, 12); 22 (ibid. 1958a, 20, fig. 16, 2); 24 (ibid. 1958a, 21, fig. 17, 14–16); 25 (ibid. 1958a, 20, fig. 16, 4–5); 29C (ibid. 1958b, pl. 7, 116); 38 (Rest 1948, pl. 27, lower right); 39 (Dehn 1941, 89, fig. 51, 5); 40A (Haffner 1976, pl. 5, 3); 42 (Joachim 1981, 15, fig. 4, 5); 43 (Joachim 1977, 88); 45 (Frohberg 1974, 145, fig. 1); 50 (see catalogue); 51A (Pl. 28B); 51B (see catalogue); 59 (unpublished); 64A (Pl. 35A, 3–4); 74A (Pl. 41C, 4–5); 75 (see catalogue); 87 (Pl. 47C, 2); 89A (Zürn 1987, pl. 387, 11); 90 (see catalogue); 103 (Pl. 59, 6–9); 109 (Pl. 68A, 2); 111 (Pl. 70B, 1); 118 (Pl. 77A, 5.7); 123 (Pl. 79B, 5–6); 128 (Pl. 85B, 1.3.5–6.8); 137 (Pl. 88A, 1); 147B (Pl. 98, 15–16); 148/i (Pl. 101); 148/ii (Pl. 103); 148/iii (Pl. 104); 152 (Pl. 115, 8–9); 164 (Pl. 122B, 1); 176A (Pl. 128, 1); 176B (Pl. 130A, 1.4); 177 (Pl. 130B, 7).

Ten tyres cannot be assigned to any of the above seven types. Two of them seem to have a simple curved 'C'-shaped cross-section (Pls 62, 5; 97B, 6). Three tyres have narrow cross-sections, 15–21 mm wide, trapezoidal or semicircular in shape. Of these, Lengenfeld and Beilngries, 'Im Ried-Ost', grave 128 have flat inner surfaces, while Hradenín grave 46 has lips along the edges of the inner surface of the tyre (Pls 61A, 1; 94A; 112B, 3–4). Mitterkirchen, tumulus II, grave 1 and Somlóvásárhely have wide curved cross-sections, measuring respectively 27 and 35 mm in width. The odd tyre from Winterlingen tumulus III and the tyres from Oberleinach are rectangular in cross-section with slightly raised edges, measuring respectively 28 and 26 mm in width (Pls 53, 1; 78, 1). Finally, the tyre fragments from Tannheim tumulus VI are poorly preserved, and could belong either to types I, II or possibly type V (Pl. 51A, 6).

The typological classification of the tyres and nails is necessarily coarse, appropriate for simple forged iron fittings. Damage by corrosion limits the precision of the classification. The tyres are only rarely elaborate or distinctive enough for fine typological parallels to be drawn. The beaded cross-sections of the type Ia tyres from Lhotka and Großebstadt, cemetery I, grave 1 (Fig. 48, 114A.153), for example, are distinctive. Otherwise, a finer classification of the tyres must be based on the combination of a number of indicators, particularly the tyre cross-section and nail type, for example showing a similarity between the tyres from Kladruby (Pl. 115, 8–9) and Dillingen-Kicklingen (Pl. 68A, 2).

The distributions of the tyres and nails are of considerable interest. The tyres of type VC (cross-section of type V

and nails of type C) have a close distribution in south-west Germany, with outliers in Bohemia and Lorraine (Fig. 50). In contrast, the tyres of type IA are concentrated further to the east, in Bavaria and Bohemia (Fig. 49). The tyres of types VI and VII have a much wider distribution, reaching from Burgundy to Moravia. It is interesting to note their nails: those of type D, with large round heads, are almost completely restricted to the area west of the Rhine – the only exceptions being from the Býčí-skála cave in Moravia (Fig. 51). The nails with square heads (type E), by contrast, are mainly distributed in South Germany. The tyres of types II, III and IV are almost completely restricted to South Germany and Bohemia. These varying distributions can be explained by chronological factors, such as the westward spread of wagon burial during the Hallstatt period, and by the activity of distinct workshop groups suggested, for example, by the compact distributions of the tyres of type VC and the tyres with large round nail heads (types VID and VIID). These questions will be discussed below, in Ch. 11.

Apart from the nail types and the cross-sections of the tyres, further information can be gained from a study of the spacing of the nails and the tyre width. The graph on Fig. 52 includes information from 72 wagons where the tyre cross-section and the spacing of the nails can be seen. The graph shows that only tyres of types I and V have nails spaced closer than 100 mm apart. In fact, the nails on type V tyres are generally even more closely spaced (mainly 30–60 mm apart) than those on type I (mainly 50–95 mm apart). The graph also shows that all the tyres which measure more than 27 mm in width have cross-sections of type VII (the one exception comes from Asperg, 'Grafenbühl', where the tyres are about 35 mm wide and have a cross-section of type II; Pl. 30, 1–2). The rest of the tyre types (II, III, IV and VI) measure 16–27 mm in width and have nails spaced at least 100 mm apart.

Tyre types I, V and VII have been clearly defined not only by their cross-section and nail types, but also by their widths and the spacing of their nails. On the other hand, the tyres of types II, III, IV and VI have similar widths and their nails are similarly spaced. Nevertheless, the validity of these four types is reinforced by their use of different nails (Fig. 79): thus countersunk nails seem particularly characteristic for tyre types III and IV. Tyres of type VI typically seem to have been used with large-headed nails of types D and E, whereas large-headed nails were only very rarely used on tyres of type II.

4.3 FELLOES AND FELLOE-CLAMPS

Making and fitting the felloes is the most difficult task of the wheelwright. His problems are, no doubt, reflected in the rapid development of a multiplicity of methods of felloe construction. However, Hallstatt period felloes received little attention until 1970, when G. Kossack published the wagon-graves from Großebstadt and offered a reconstruction for the wheels from grave 1 (Fig. 55; Kossack 1970, 44–61; 1971). The principles outlined by Kossack have been developed here in an attempt to

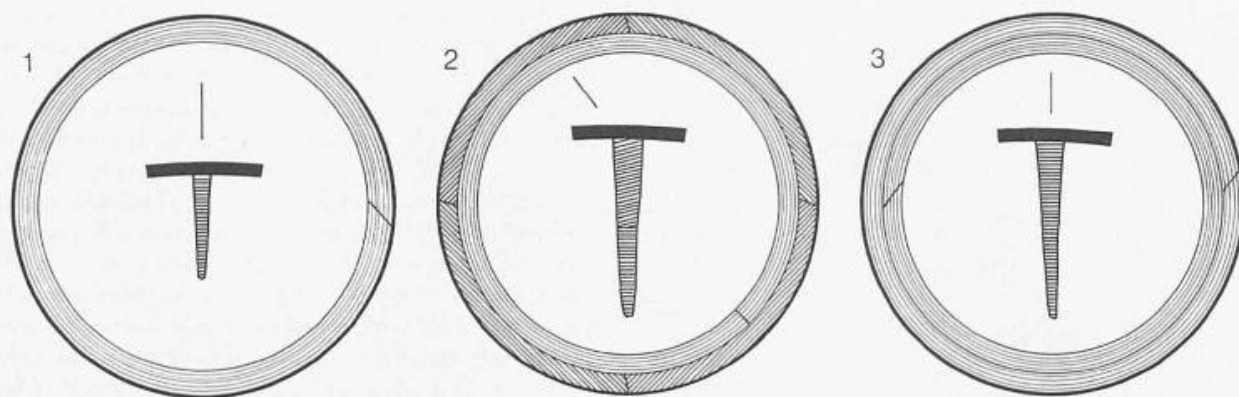


Fig. 53 Schematic representation of the construction of Early Iron Age felloes, and the sorts of wood grain which survive on the tyre nails: 1 Gottesberg construction, 2 Großeibstadt construction, 3 Bruck construction. – Not to scale.

trace the development of wheel-making technology during the Hallstatt period.

Much information is available about the felloes of Hallstatt period wagons, deriving from felloe-clamps and, more frequently, from traces of wood grain which survive, impregnated with iron oxide, on the surface of tyre nails. These imprints are of three types (Fig. 53). The nails may be relatively short, with wood grain running exclusively in a direction parallel to the tyre (Fig. 53, 1). Longer nails are also found, in which case they can bear horizontal traces near the tip of the nail and diagonal grain nearer the base of the nail shaft (Fig. 53, 2), or horizontal grain both at the base and tip of the nail (Fig. 53, 3). These three types of imprint correspond to the three different felloe constructions which can be recognised on Hallstatt wagons, which will be called types Gottesberg (Fig. 53, 1), Großeibstadt (Fig. 53, 2) and Bruck (Fig. 53, 3). The three types of construction will be introduced with the aid of the three eponymous graves, Lupburg-Gottesberg, grave 3, Großeibstadt, cemetery I, grave 1 and Emmerting-Bruck.

1) *Gottesberg*: The only surviving wagon component in grave 3 from Lupburg-Gottesberg was an iron tyre fragment of type III with nails of type B (Pl. 84B). The tyre fragment was provided with three nails, spaced 117–119 mm apart, two of which survived to their full length. The tips of these two nails had obviously penetrated through the inside of the felloe and been hammered over, demonstrating that the felloe was 68 mm high. All three of the nails bear imprinted wood grain on their shanks, which in every case runs parallel to the tyre (as on Fig. 53, 1). Clearly, the felloe of this wheel was made of bent wood and, judging from the height of the felloe, it was made from a single bent board.

2) *Großeibstadt*: This type of felloe was first recognised by G. Kossack (1970, 44–61; 1971) on the wagons from Großeibstadt, cemetery I, grave 1 and Hradenín grave 46. The tyres from the Großeibstadt grave were of type Ia, with nails of type A spaced 65–75 mm apart. The nails were originally 90–95 mm long, and reached through the

whole thickness of the felloe. Plate 73, 1 shows one of the tyre fragments which demonstrates well the wooden structure of the felloe. None of the six nail shafts on this fragment survives completely, but in every case the surviving stumps of the nails bear wood grain. Towards the base of the nails, the grain runs in a direction diagonal to the tyre. Indeed, nail F on Pl. 73, 1 has diagonal grain running in a different direction to that of the other nails. Towards the tip of nail E the wood grain again runs in a different direction: this time parallel to the tyre. The felloe of this wheel is obviously of composite type, put together from several pieces of wood. Considering other evidence from the grave, including remains of wood grain on the felloe-clamps, Kossack realised that this was a double felloe, constructed in two layers. The outer layer was made from a number of planks (probably eight), and the inner layer was made from a single bent board (Fig. 55; see also Köngen, Fig. 56 and Ohnenheim, Fig. 57).

3) *Bruck*: One of the tyre fragments from Emmerting-Bruck (belonging to the second group of tyres from this cemetery, cat. no. 113/ii) serves as a good example for the third type of felloe construction which can be observed in the Hallstatt period (Pl. 72, 1). The tyre is of type II and bears the remains of six type G nails, the longest surviving to a length of 80 mm. All the nail shafts bear imprinted wood grain, which runs parallel to the tyre – both at the base of the shafts and towards the nail tips. The felloe was therefore made of bent wood. But in this case, because the felloe was so high (at least 80 mm in height), it was probably a double felloe made from two bent felloe boards. Indeed, the wood grain on the nail shanks may bear traces of a join between the two felloe boards, at a distance of 36–40 mm from the inside of the tyre.

Sadly, owing either to the absence of wood grain remains, or the poor preservation of the tyre nails, it is often impossible to tell which sort of felloe construction was used on a particular wheel. The problem is less serious for Großeibstadt felloes, which can be recognised even from slight traces of diagonal wood grain surviving on nails or felloe-clamps. Furthermore, a series of felloe-

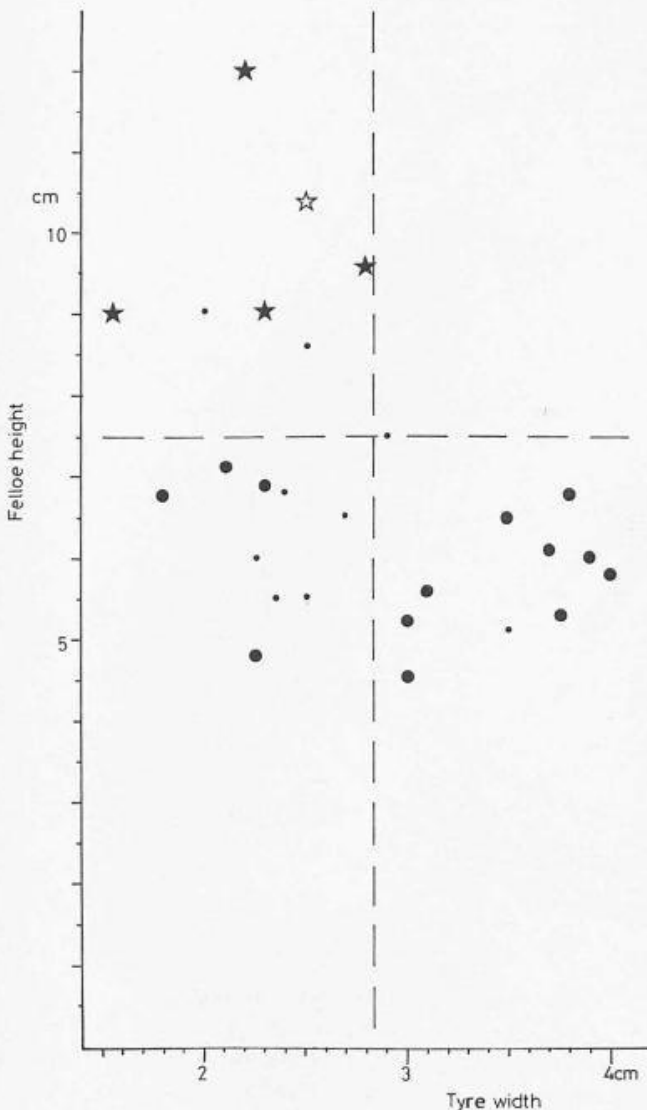


Fig. 54 Graph comparing the felloe heights and the tyre widths of Early Iron Age wheels (large black circles: Gottesberg felloe construction; black stars: Großeibstadt construction; white star: Bruck construction; small black circles: felloe construction unknown).

clamps seems only to have been used with the Großeibstadt construction (riveted clamps, see below), which is again clearly of value for the recognition of this felloe type. It is more difficult to identify the Gottesberg type because the height of the felloe must be known to ensure that it is of single-layered construction. All the information from the Hallstatt period suggests that low, single-layered felloes were always made from a single bent board (Gottesberg type). The Bruck construction is even more difficult to recognise: it is necessary to know that the felloe was high (two-layered), and that both layers were made from bent felloe boards. Although it is often difficult to be certain about a wagon's felloe construction, we may draw conclusions from the better-preserved wagons to help in the understanding of problematical cases.

On 28 wagons the height of the felloe can be measured, mainly from fully preserved tyre nails whose tips projected

through the felloes and were hammered over. These 28 cases are shown on Fig. 54, where for each wagon the felloe height is plotted against the width of the tyre. Of these 28 wheels, the felloe construction can be detected, according to wood grain remains, in 18 cases. The graph illustrates that Gottesberg felloes may reach a height of as much as 72 mm, or perhaps even 75 mm. There is a noticeable absence of felloes with heights measuring between 75 and 85 mm, and the latter figure seems to mark the minimum height of double felloes of Bruck or Großeibstadt construction. 75 mm may therefore be accepted as the maximum thickness of wood which could be bent into a hoop of the size required for a wheel. Kossack (1970, 146), relying on information from modern workshops, estimated the maximum height of a bent felloe of 0.8–1.0 m diameter at 65 mm. However, the evidence from the wagons of Gottesberg grave 3 (felloe height 68 mm), Hradenín grave 28 (felloe height 71 mm), Dietfurt grave 31 (felloe height 69 mm) and 'Hohmichele', grave VI (felloe height ca. 68 mm) suggests that the wheel-makers of the Hallstatt period could, in fact, make slightly thicker bent felloes. Indeed, it even seems probable that the felloes from Bell, about 75 mm high, were also of the single, bent Gottesberg type.

However, 75 mm should be regarded as the maximum height of a single bent felloe. In every case when a higher felloe is indicated and the felloe construction is known, it was a double felloe of Großeibstadt or Bruck type (for example Beilngries, 'Im Ried-Ost', grave 128: felloe height 90 mm; Köngen: felloe height 120 mm; Großeibstadt, cemetery I, grave 1: felloe height 90 mm; perhaps Bruck, tyre group ii: felloe height 104 mm; Reichenau tumulus B: felloe height ca. 96 mm). Furthermore, the graph (Fig. 54) shows that in every case in which the tyre measured more than 29 mm in width, the wheel had a Gottesberg type single bent felloe construction.

These conclusions can be used to form two hypotheses, which will be applied to suggest the felloe constructions of wheels on which the wooden remains are too poor for an unambiguous felloe reconstruction:

- 1) The maximum height of a single bent felloe of Gottesberg type is 75 mm. Wheels on which the felloe is demonstrably higher than 75 mm must have had a double felloe construction either of Großeibstadt or Bruck type.
- 2) All tyres measuring more than 29 mm in width had a single bent felloe of Gottesberg type.

These hypotheses are not inherently unlikely. Thus Kossack arrived at a similar maximum height for a bent felloe (65 instead of 75 mm), by consulting modern woodworkers (1970, 146). The second hypothesis is also not unreasonable, because a double felloe construction on a tyre more than 29 mm wide would result in a felloe far too heavy and strong for the light wagons which seem to be represented in our wagon-graves.

The discussion of the three types of felloe construction documented in wagon-graves of the Hallstatt period has already introduced the function of felloe-clamps. The clamps show a remarkable variety in design, which is

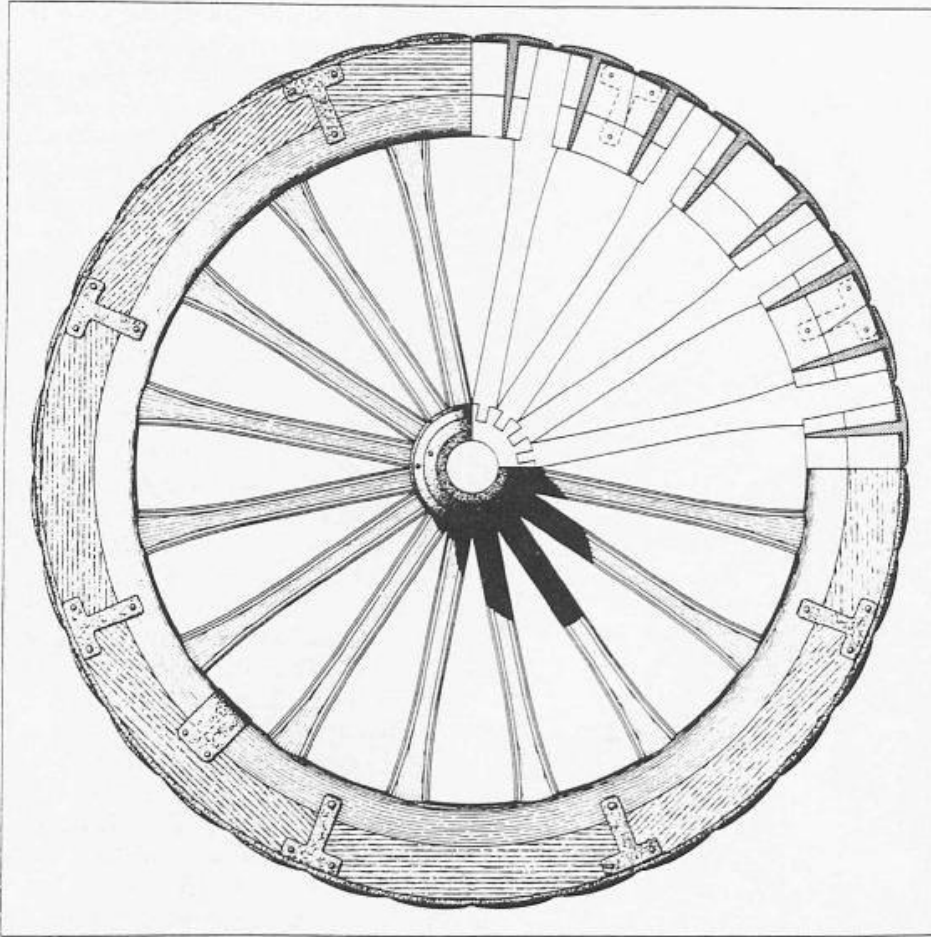
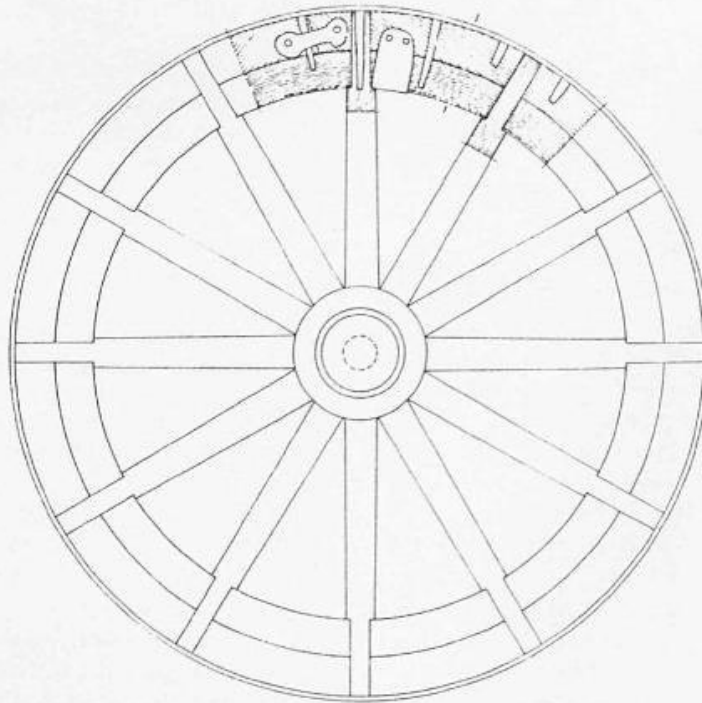


Fig. 55 Reconstruction of a wheel from Großesbstadt, cemetery I, grave 1 (after Kossack 1970). — Scale ca. 1:8.



0 50cm

Fig. 56 Reconstruction of a wheel from Königs, showing the detailed construction of part of the felloe.

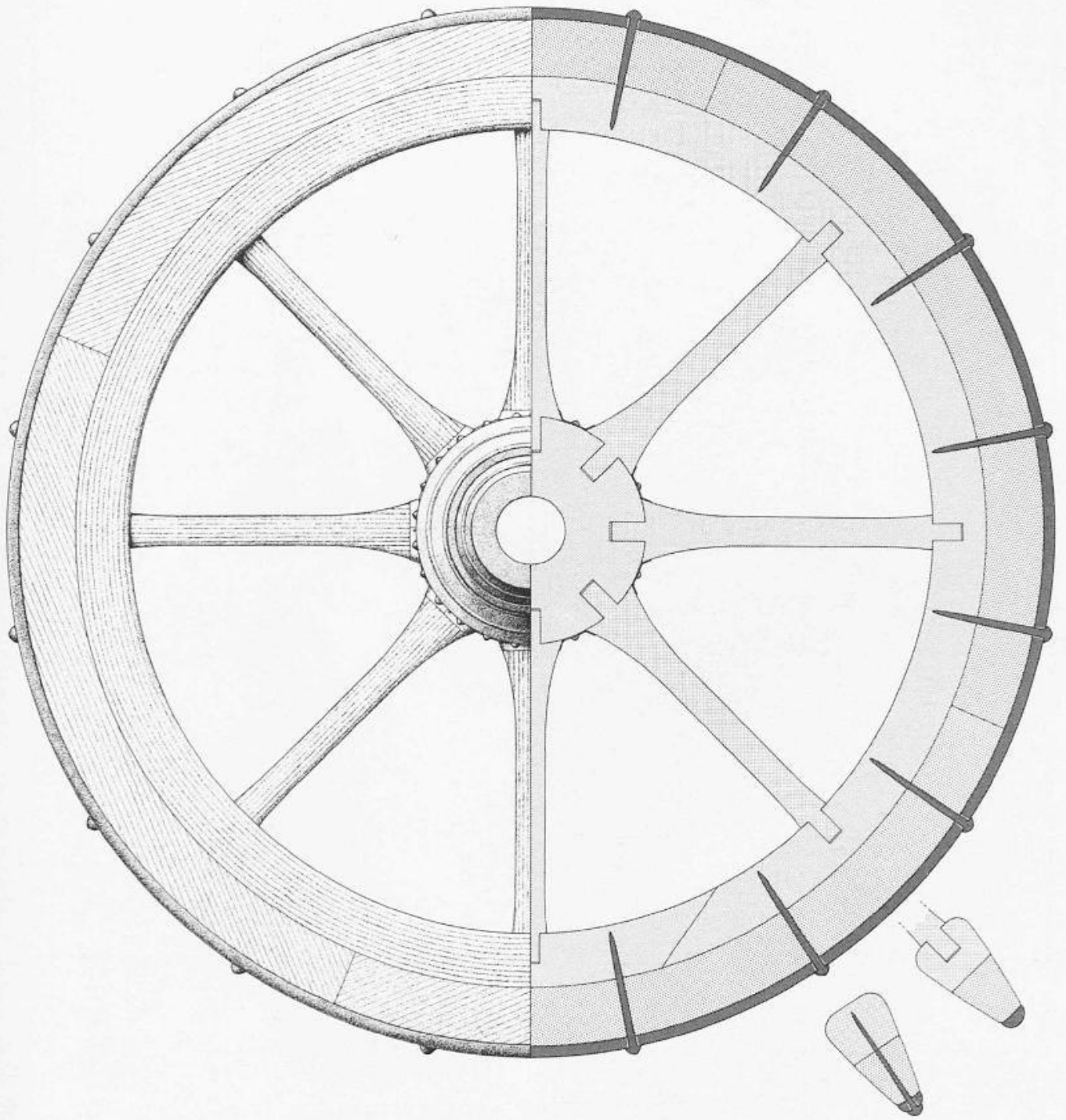


Fig. 57 Reconstruction of a wheel from Ohnenheim, Alsace (after Egg 1987a). – Scale 2:9.

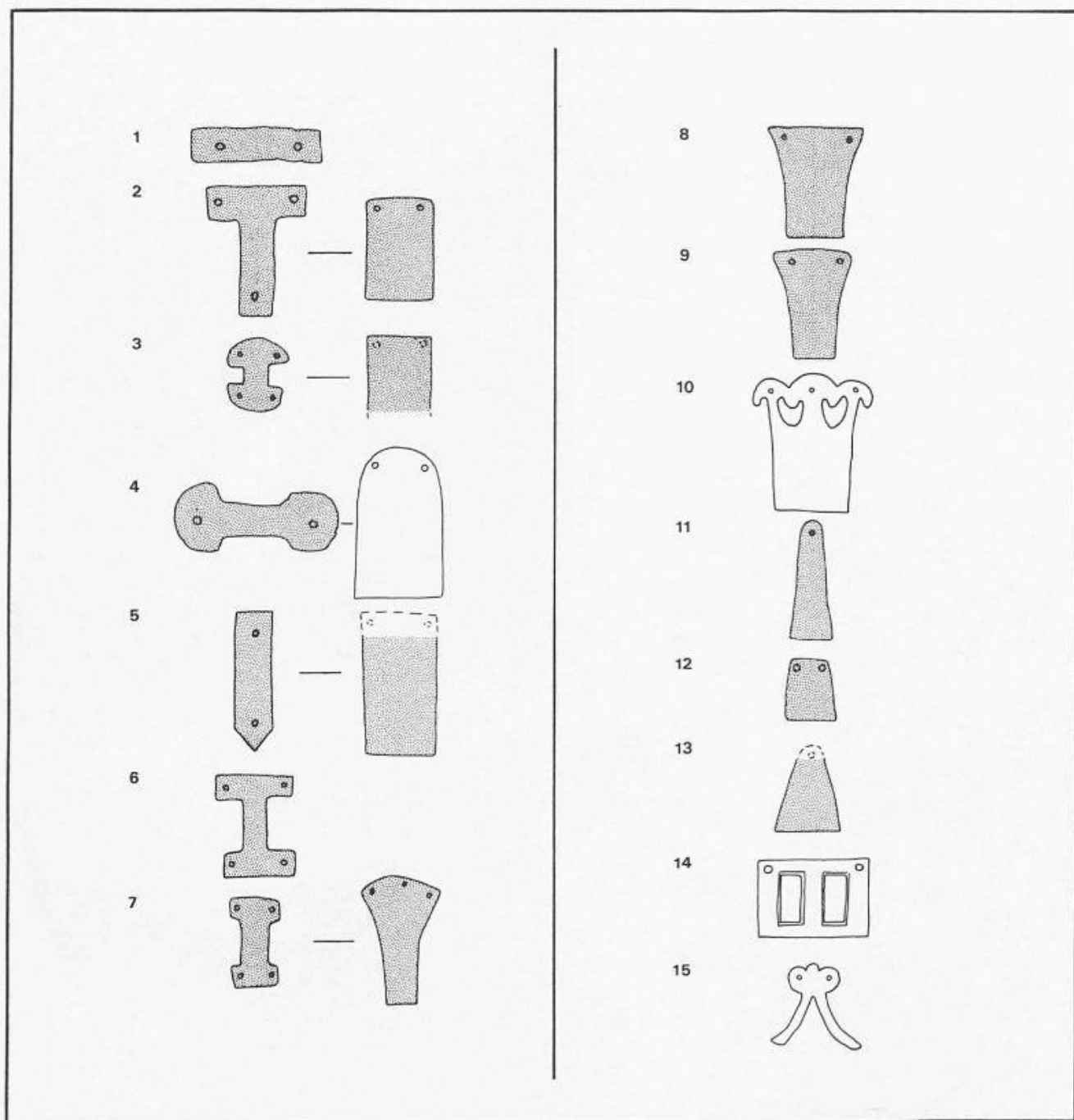


Fig. 58 Felloe-clamps: the far left column shows riveted clamps, the middle and right columns show 'U'-shaped clamps. Iron is stippled, bronze is white. — Scale ca. 1:4.

summarised in Fig. 58. Broadly, the clamps divide into two series: riveted clamps, composed of two iron plates riveted together (Fig. 58: left column), and 'U'-shaped clamps, composed of a strap of iron or bronze sheet bent around the inner side of the felloe with each end fastened by nails (Fig. 58: middle and right columns).

Riveted clamps are characteristic of Großeibstadt felloes, and served to cover the joins between the planks of the outer felloe layer. Six different shapes have been found:

Fig. 58, 1: Rectangular (Como-Ca'Morta grave of 1950: Pl. 132B, 5–11).

Fig. 58, 2: 'T'-shaped (Großeibstadt I/1, Neu-Esting, Lhotka, Vikletice grave 138: Pls 73, 3; 117, 4.7.9–10; 127B, 3; Fig. 198).

Fig. 58, 3–4: 'Dumb-bell'-shaped (set vertically: Straškov grave of 1911: Pl. 125A, 5–6.8–10; set horizontally: Königen: Fig. 56).

Fig. 58, 5: Pointed iron bands (Beilngries, 'Im Ried-Ost', grave 128: Pl. 61, 10).

Fig. 58, 6–7: 'I'-shaped (Harburg-Marbach, Hradenín grave 46, possibly Reichenau: Pls 75B, 2–3; 113, 12–16).

Apart from riveted clamps, a Großeibstadt felloe probably always required a 'U'-shaped clamp to cover the

join of the bent inner felloe board (Fig. 58, middle column; 'U'-shaped clamps are absent from Como-Ca'Morta grave of 1950, Reichenau and Harburg-Marbach: this is probably due to chance lack of preservation).

In the case of the wagons with 'T'-shaped clamps, the 'U'-shaped clamps were probably fairly low, and did not reach far over the plank felloe layer (for example Großeibstadt I/1: Fig. 58, 2). Otherwise, the 'U'-shaped clamps seem to have been longer, covering both felloe layers: for example Köngen (Figs 56; 58, 4 – bronze), Beilngries, 'Im Ried-Ost', grave 128 (Fig. 58, 5) and Hradenín grave 46 (Fig. 58, 7). On other felloes of Großeibstadt type, riveted clamps seem to have been dispensed with, and 'U'-shaped clamps with everted 'trumpet'-shaped ends were sufficient: Blotzheim; Beilngries, 'Im Ried-West', grave 74 (Fig. 58, 8); Großeibstadt II/2 (Pls 8B, 1–2; 62, 11–13; 74B, 2.4–6).

Felloes of Gottesberg and Bruck type were only fitted with 'U'-shaped clamps. These can be of various types:

- 1) Everted, 'trumpet'-shaped clamps (Fig. 58, 9: Straškov grave of 1913; Belzheim tumulus 104; Dietfurt; Dittenheim).
- 2) The elaborate clamps from Sesto-Calende grave B (Fig. 58, 10) and Marainville-sur-Madon (Fig. 66, 1).
- 3) Narrow high clamps with rounded ends (Fig. 58, 11: Donauwörth; Hradenín grave 28; Mauenheim, tumulus N, grave 3).
- 4) A series of smaller clamps (Fig. 58, 12: Schwalbach; possibly Praha-Bubeneč; Fig. 58, 13: Oberlahnstein; Fig. 58, 14: Vix; Fig. 58, 15: Como-Ca' Morta grave of 1928).
- 5) Simple 'U'-shaped clamps with square ends, as from Straškov grave of 1911, Beilngries, 'Im Ried-Ost', grave 128 and Bell, could be used on all felloe types.

The variety and elaboration of the felloe-clamps is clearly of value as an indicator of the development of wagon construction. The clamp types are characteristic of particular felloe constructions – the riveted clamps (Fig. 58: left column) restricted to the Großeibstadt type, and the small clamps (Fig. 58, 12–15) restricted to the Gottesberg type. Unhappily, the Bruck construction does not have a corresponding typical type of clamp: the types to be found on Bruck felloes (Fig. 58, 9–10) being little different from those on felloes of Großeibstadt and Gottesberg types. Finally, it is important to notice that the felloes and felloe-clamps of the vehicles from Sesto-Calende and Como-Ca'Morta seem to mirror the development north of the Alps.

The information available to us about Hallstatt period felloes is summarised below.

4.3.1 Felloes of Grosseibstadt type

Twenty three (perhaps 24) wagons from the area north of the Alps had Großeibstadt felloes. Of these, it has been possible to calculate the felloe heights of only three wagons (Großeibstadt I/1: 90 mm; Beilngries, 'Im Ried-Ost', grave 128: 90 mm; Köngen: 120 mm). The height of the external plank felloe is known in five cases, and seems to have ranged from 42 to 60 mm. It has proved more

difficult to calculate the number of plank segments in the outer felloes of these wheels. In every case where wood grain was preserved in abundance (Köngen; Hradenín grave 46; Großeibstadt I/1) it seems that the plank segments were not made in very regular fashion. It is possible that (i) plank segments of unequal length were used on the same wheel, (ii) planks with uneven grain were used, or (iii) the four wheels on a wagon were not given the same number of outer plank segments. Be that as it may, the principle of construction of this type of wheel is not open to question, and Kossack's reconstruction of the Großeibstadt wheel retains its validity (Fig. 55).

1) *Großeibstadt, cemetery I, grave 1*: The tyres and nails from this grave have already been introduced. The wagon remains also included iron felloe-clamps of two types, 'T'-shaped and 'U'-shaped, which induced Kossack to make his detailed study of the felloe construction (1970, 44–61; 1971). The 'T'-shaped felloe-clamps were composed of two 'T'-shaped iron plates fixed either side of the felloe by three iron rivets (Pl. 73, 3). One of the 'T'-shaped clamps was found *in situ* on a fragment of iron tyre, which showed that the upper edge of the 'T' crossbar touched the inner edge of the tyre. Indeed, the upper edge of the 'T'-shaped clamp is very slightly rounded to fit neatly to the curve of the tyre. Each 'T'-shaped clamp measured ca. 70 mm in height, and so could not have covered the full height of the felloe which, according to the tyre nails, was at least 90 mm high.

The inner surfaces of the 'T'-shaped clamps bore characteristic traces of the join between three pieces of wood from the composite felloes. On the lower half of the vertical part of the 'T'-shaped clamp, the wood grain ran in a direction parallel to the tyre, and corresponds to the bent inner felloe board. On the upper part of the 'T'-shaped plate a diagonal join is visible between two planks of wood whose grain runs in a direction diagonal to the tyre. This corresponds to the join between two of the plank segments of the outer felloe. Each wheel was fitted with several 'T'-shaped clamps. The original number of clamps for each wheel can only be estimated, but the best preserved wheels, in the north-west and north-east corners of the grave, had respectively three and five clamps surviving.

The 'U'-shaped felloe-clamps fitted around the inner part of the felloe, which was rounded in profile. Each of the four wheels of the wagon seems to have been provided with just one of these clamps, which always bear horizontal wood grain corresponding to the bent inner felloe. One of the clamps (Pl. 73, 2) shows slight traces of the blunt join of the ends of the spanned felloe.

The proposed function of these clamps is illustrated on Kossack's reconstruction of a wheel from Großeibstadt (Fig. 55). Kossack estimated the number of plank segments in the outer felloe by an ingenious method. He realised that the angle of the wood grain at the join of the plank segments indicates the number of segments, assuming that straight-grained pieces of wood of uniform length were used for the segments. Simple geometry shows that,

if the segments are of uniform length and have parallel wood grain, the number of segments is given by the following equation:

$$\frac{360}{180 - (\text{angle at join of segments})}$$

In fact, the observed angles of the joins vary between 120° and 136°, and indicate between six and eight segments, with eight segments being more likely. The fact that the angle at the join of the plank segments varies quite widely (between 120° and 136°) indicates that the wheels from Großeibstadt were not made in a very regular fashion. Nevertheless, Kossack was able to put forward his idealised reconstruction of a wheel from this wagon, with a two-layered felloe, each layer measuring ca. 45 mm in height, the outer felloe composed of eight plank segments and the inner felloe made from a single bent board (Fig. 55).

2-3) *Großeibstadt, cemetery II, graves 2 and 14*: These two graves have not yet been published in any detail, but with the kind permission of M. Schifferdecker, the author was able to study some of the finds. The wagon fittings in grave 2 included fragments of 'U'-shaped felloe-clamps which, when reconstructed, indicate that the felloe was at least 75 mm high. Furthermore, one of the felloe-clamp fragments (Pl. 74B, 2) and one of the nail shanks (Pl. 74B, 7) bears diagonal wood grain. It seems, therefore, that the felloe was of Großeibstadt type, but further details of construction are, as yet, unknown. The wagon finds from grave 14 were not available for study, but apparently included tyres with long close-set nails. Considering also that the nave fittings from this grave 'correspond exactly to those of cemetery I, grave 1' (Wamser 1981a, 246), it seems likely that the felloe construction was, as in cemetery I, grave 1, also of composite Großeibstadt type.

4) *Beilngries, 'Im Ried-Ost', grave 128*: Diagonal wood grain is visible on the tyre nails of this wagon (Pl. 61, 1-2). On two nails the wood grain is so characteristic that a felloe of Großeibstadt type is already certain (Pl. 61, 4-5); the nails show that the internal bent felloe was 37-38 mm thick. On one of the tyre fragments (Pl. 61, 1) the diagonal wood grain on the tyre nails can be seen to run in two different directions, corresponding to two plank segments of the outer felloe. The wood grain of these two plank segments can be seen to form an angle of about 97°, indicating that the outer felloe was probably composed of four such segments.

Two types of clamp were used on the felloe of this wagon. The 'U'-shaped clamps (Pl. 61, 7-8) bear wood grain both from the outer and inner felloe. The other felloe-clamps are formed from two pointed iron bands, fastened together by two iron rivets (Pl. 61, 9-10). These clamps show the cross-section of the felloe, becoming narrower towards the tyre which was only 15-16 mm wide. One of these fragmentary felloe-clamps bears traces of wood grain from the join between the outer and inner felloe layers (Pl. 61, 9), suggesting that the outer felloe layer was 50-54 mm high. Together with the thickness of

the bent inner felloe (37-38 mm), this demonstrates a total felloe height of about 90 mm.

5) *Beilngries, 'Im Ried-West', grave 74*: The tyre fragments from this wagon have nails bearing both diagonal wood grain from the outer planks as well as horizontal grain from the bent inner board of a Großeibstadt type of felloe (see especially Pl. 62, 1.4.9.10). On one nail (Pl. 62, 4) the join between the outer and inner felloe layers is visible, showing that the outer plank felloe was 42 mm high. On two of the tyre fragments, traces of joins between external plank segments can be seen (Pl. 62, 4.9). Using the principle devised by Kossack for the wagon from Großeibstadt, cemetery I, grave 1 (see above), it is possible to estimate the number of external felloe segments from the angle of their wood grain where they join. In these two cases, the angle of wood grain on the tyre nails was very steep, forming angles of 43° and 47° with the tyre, at the point of the join of the felloe segments. Simple geometry demonstrates that on these wheels the outer felloe layer was most probably composed of four plank segments. The wagon from this grave was furnished with iron felloe-clamps, of which numerous fragments remain (Pl. 62, 11-13). The wood grain on these fragments provides no additional information about the felloe construction.

6) *Beratzhausen grave 3*: The tyre nails of this wagon bear traces of diagonal wood grain (Pl. 63, 26-28.30-32). One nail shank (Pl. 63, 31) shows wood grain both from the bent inner board and the outer plank segment of a Großeibstadt felloe. On one tyre fragment (Pl. 63, 26) diagonal wood grain is seen on a nail shank up to 45 mm from the tyre, showing the minimum height of the external plank felloe layer.

7) *Lupburg-Gottesberg grave 1*: The tyres from this grave are similar to those from Beratzhausen grave 3 (Pl. 84A, 6.10-13). Again the tyre nails bear traces of diagonal wood from the outer plank felloe. On one fragment (Pl. 84A, 6) the diagonal wood survives up to a distance of 46 mm from the tyre, giving the minimum height of the outer plank felloe.

8) *Olching - Neu Esting, 'Leberberg'*: Although the wheel fittings from this grave have not survived, some of the tyre fragments were sketched at the time of excavation. On one sketch remains of a 'T'-shaped and a 'U'-shaped felloe-clamp are clearly visible, indicating a Großeibstadt felloe construction (Fig. 198).

9) *Aistlingen, 'Oberes Ried', tumulus 1*: The tyre nails from this wagon are only preserved to a length of 35 mm and so only bear diagonal wood grain from the external plank felloe layer (Pl. 56A, 3-5). On one of the tyre fragments, a join is visible between two outer plank segments (Pl. 56A, 4), with the wood grain of one segment meeting the tyre at an angle of 48°. This generates an estimated number of 4.3 outer plank segments, perhaps suggesting that the wheel originally had four plank segments. On another tyre fragment, remains of an iron felloe-clamp are visible (Pl. 56A, 5).

10) *Harburg-Marbach, tumulus 1*: The diagonal wood grain on one of the tyre nails of this wagon (Pl. 75B, 4), as well as the 'T'-shaped riveted felloe-clamps (Pl. 75B, 2-3) indicate that a Großeibstadt felloe construction was used on these wheels.

11) *Leipheim, 'Waldteil Justing-West', tumulus 14*: Most of the nails on these tyre fragments bear diagonal wood grain (Pl. 83A, 4.6.9), but one nail tip (Pl. 83A, 5), which had clearly penetrated through the inside of the felloe and been hammered over, had horizontal grain, presumably from the internal bent board of a Großeibstadt felloe. On one piece of tyre, a fragmentary felloe-clamp survives (Pl. 83A, 6). On another tyre fragment (Pl. 83A, 4), a join is visible between two outer felloe plank segments. The diagonal wood grain of one of the segments meets the tyre at an angle of ca. 70°, suggesting that there were originally 8-10 segments in the outer felloe.

12) *Albertshofen tumulus of 1936*: The felloes of this wagon were 86 mm high, but no wood grain survived to put a Großeibstadt felloe beyond doubt (Pl. 57, 6.13). However, the 'U'-shaped felloe-clamps from this grave (Pl. 56B), being only 67-68 mm high, could not have reached around the whole of the felloe, and probably fulfilled the same function as the 'U'-shaped clamps on the wagon from Großeibstadt I/1. In this case we would have to assume that the joins of the outer plank felloe had been covered by a series of clamps which have not survived, which would not be unlikely in view of the poor preservation of this wagon.

13-14) *Velburg-Lengenfeld tumulus of 1870 and Wehringen, 'Hungerbrunnenmähder', tumulus 1*: The surviving fittings from these wagons provide little information about their felloes. The tyre nails of both wagons bear wood grain running in a direction diagonal to the tyre (Pls 94A; 97B, 7), suggesting felloes of Großeibstadt type.

15) *Hradenín grave 46*: Wood grain hardly survives on the nails of these tyres; the exception being a nail tip which had penetrated through the internal bent felloe (Pl. 112B, 2). However, the numerous 'U'-shaped and 'T'-shaped felloe-clamps show that the felloe was of Großeibstadt type (Pl. 113, 2-16). The 'U'-shaped clamps show that the felloe must have been at least 80 mm high. Both types of clamps were used to cover the joins between the external felloe plank segments. On many of the clamps, imprints of wood grain survive at the joins, showing the wood grain of the plank segments meeting at the following angles: 106°, 116°, 119°, ca. 120°, 123°, and 147°. The angles betray a surprising variation, and indicate estimates between 4.8 and 10.9 for the number of external felloe plank segments. It is apparent that on this wagon the external plank segments were probably not of uniform length, and the wheels may have had different numbers of external plank segments. According to the wood grain on the 'U'-shaped felloe-clamps, the bent board of the internal felloe measured 30-33 mm in height, and the external felloe was at least 39-49 mm high.

16) *Hradenín grave 24*: The tyre nails of this wagon bear

diagonal wood grain from the outer layer of a Großeibstadt type of felloe. On one tyre fragment (Pl. 109, 1), diagonal wood grain from two adjacent plank segments can be seen, which form an angle of ca. 93.5°, indicating that there were probably four plank segments on that wheel. These wheels do not seem to have been provided with felloe-clamps, and no fittings survive to document the felloe height. However, the excavator reported that the tyre nails survived to a length of 65-70 mm, which indicates the minimum height of the felloe.

17) *Lhotka*: The nails on the tyres from Lhotka (Pl. 117, 1-2) bear diagonal wood grain. The felloes were provided with 'T'-shaped (Pl. 117, 4.7.9-10) and probably also 'U'-shaped clamps (Pl. 117, 3). The 'T'-shaped clamps bear the typical wood grain imprints of a Großeibstadt type of felloe, showing the join between outer felloe plank segments, and the horizontal wood grain of the internal bent felloe. On one clamp (Pl. 117, 10) it is possible to measure the angle formed by the wood grain of adjacent outer felloe plank segments. The angle measures 115°, indicating an estimated 5.5 plank segments for the outer felloe.

18) *Vikletice grave 138*: Very few wagon fittings survive from this grave. The fittings included a few nails, probably from the tyres (Pl. 127B, 6-9) and a fragmentary 'T'-shaped felloe-clamp (Pl. 127B, 3). The felloe-clamp fragment bears traces of wood grain, indicating a Großeibstadt type of felloe.

19) *Straškov tumulus of 1911*: No tyres survived from this wagon. However, the felloe-clamps bear sufficient wood grain to make a Großeibstadt felloe certain. Diagonal wood grain is seen both on the fragmentary 'U'-shaped clamp (Pl. 125A, 7) and on the 'dumb-bell'-shaped clamps (Pl. 125A, 5-6.8-10). On four of the clamps it is possible to measure the angle formed by the wood grain from adjacent plank segments in the outer felloe: 109°, 128°, 129°, 132°. These measurements suggest five to eight outer felloe segments.

20) *Köngen*: The only object remaining *in situ* in the badly disturbed wagon-grave from Köngen was a length of iron tyre with a riveted 'dumb-bell' shaped clamp and a bronze 'U'-shaped clamp. The clamps show clearly that the felloe measured ca. 120 mm in height, composed of an inner bent board ca. 62 mm high and external plank segments accounting for ca. 60 mm of the felloe height. Numerous fragments of 'dumb-bell'-shaped clamps survived from the grave, and on 10 of the clamps it was possible to measure the angle formed by the grain of adjacent plank segments of the outer felloe. The angles varied widely, between 70° and 155°, indicating that the wheels were not made with uniform numbers of plank segments in their external felloe layers. A wheel from Köngen is reconstructed on Fig. 56.

21) *Reichenau tumulus B*: No traces of wood grain survive on the wheel fittings from this grave. However the nails, surviving with lengths up to 96 mm, show that a double felloe construction was used (Pl. 46B, 1-2). The felloe was

provided with iron 'I'-shaped felloe-clamps, which doubtless covered the joints between plank segments in the external layer of a composite felloe of Großeibstadt type.

22) *Tannheim tumulus VI*: One of the tyre fragments from this grave has a nail bearing diagonal wood grain (Pl. 51A, 6). Although the height of the felloe on this wagon is not known, a double felloe construction of Großeibstadt type is suggested by the diagonal wood grain on the tyre nail. A composite felloe construction is again indicated by the excavators' comment that the wood of the felloe seemed very carefully put together, suggesting a composite felloe construction (Geyr and Goeßler 1910, 33: 'Das Holz der Felgen haftete mit drei Nägeln noch an dem Reifen. An einer Stelle erschien das Holz sehr sorgfältig aneinandergesetzt.').

23) *Ohnenheim*: One of the tyre fragments surviving from this grave bears wood grain which clearly indicates a felloe construction of Großeibstadt type (Pl. 10E, 1). The outer plank felloe was 45 mm high. The wood grain on these nails meets the tyre at a sharp angle, suggesting that no more than four plank segments had been used in the external felloe. The wheels of the Ohnenheim wagon have been reconstructed by M. Egg (Fig. 57).

24) *Blotzheim, 'Lisbühl'*: The only wheel fittings surviving from this wagon are two fragmentary felloe-clamps (Pl. 8B, 1-2). Because the clamps bear traces of diagonal wood grain, a Großeibstadt felloe construction seems likely.

25) *Como-Ca' Morta grave of 1950*: The only wheel fittings surviving from the cremation grave of 1950 from Como-Ca' Morta are seven rectangular iron plates (lengths 70-80 mm, widths 20-25 mm), each with a pair of rivets (Pl. 132B, 5-11). These should be interpreted as felloe-clamps, particularly because slight traces of wood grain betray the typical pattern of the join of external Großeibstadt felloe planks. It is not known whether the felloes of this vehicle were also provided with 'U'-shaped clamps, but they would have been required if the felloes were of Großeibstadt type.

4.3.2 Felloes of Bruck type and other wagons with double felloes

It was predicted above that the Bruck type would be the most difficult felloe construction to identify. In fact, it can only be demonstrated on two wagons north of the Alps (Emmerting-Bruck and Pilsach-Niederhofen) and one wagon from North Italy (Sesto-Calende grave B), with the construction being probable on four further wagons. In no case has it been possible to calculate the original felloe height.

1) *Emmerting-Bruck*: Two groups of tyres have survived from the excavations of this cemetery. The first group (cat. no. 113/i) is of type III with countersunk (type G) nails, and the nails bear wood grain demonstrating the Bruck type of felloe construction (Pl. 72, 1). The second group is again of type III, but is slightly wider and has small nail heads of type B (Pl. 72, 3-5). Although they are

different, it is possible that both types of tyre came from the same wagon, particularly because the excavator mentioned that the front pair of wheels was smaller in diameter than the rear pair. Indeed, the first group of tyres have an estimated diameter of 760 mm, while those of the second group have a diameter of ca. 950 mm. It is impossible to resolve this question finally, but there is no reason why the second group of tyres could not have been used with the first group on the same wagon. Both types of tyres could have been used on wheels with Bruck felloes, but this is again uncertain because the second group of tyres bore no traces of wood grain. While the height of the felloes of the second group of tyres is known (104 mm), the nails of the first group of tyres are not fully preserved and show merely that the felloes were at least 80 mm high. As mentioned above (p. 52), it may be possible to detect the join between the inner and outer felloe layers on the tyres of the first group, which would indicate an outer felloe ring 36-40 mm high.

2) *Pilsach-Niederhofen tumulus 4*: The tyre nails from this wagon show that the outer felloe was made from a bent board or boards, and that the felloe was at least 78 mm high (Pl. 87A, 3-4.19-22). The felloes were provided with wide 'U'-shaped felloe-clamps, which may bear traces of the join between the outer and inner felloe rings (Pl. 87A, 8.11-16).

3) *Sesto-Calende grave B*: It is particularly welcome to find in Sesto-Calende grave B confirmation for the Bruck construction, so rarely documented north of the Alps. The finds from this grave include tyres of type Ib and tyre nails with shanks up to 102 mm long. The nails were spaced 50 mm apart on the tyre and had long rectangular heads which fitted into a groove in the outer side of the tyre. The nail shanks bear horizontal wood grain along their whole length, indicating a Bruck felloe construction (e.g. Pl. 136, 3).

The wheel fittings also included at least five elaborate bronze felloe-clamps, each originally about 86 mm high (Pl. 136, 7-8). The upper ends of the felloe-clamps were decorated with an openwork trilobate design. The felloes also bore another type of bronze clamp fitted above the spokes, reaching about 80 mm up the side of the felloe (Pl. 136, 6.10). The surviving fragments indicate that there were at least three of these clamps, each decorated in openwork with a design resembling a lotus flower. Note that the shape of these clamps is comparable to examples from the late Urnfield hoard from Bad Homburg (compare Pl. 136, 10 with Figs. 37, 3; 39).

The Bruck type of felloe construction may also be suggested, with varying degrees of probability, for the wagons from Aglasterhausen-Breitenbronn, Ehingen-Belzheim tumulus 104, Haldenwang and the Straškov tumulus of 1913.

4) *Aglasterhausen-Breitenbronn*: A Bruck construction is suggested by an unpublished drawing by E. Wagner, in the *Landesamt für Denkmalfpflege* in Karlsruhe, which shows a tyre nail 82 mm long. The nail seems too long for a single-layered felloe of Gottesberg type. A Großeibstadt

felloe construction is also precluded by the horizontal wood grain on the tyre nails and felloe-clamps, so that a Bruck type of felloe construction remains most probable (Pl. 26, 1–3.7.9–11).

5) *Straškov, grave of 1913*: Two wagons seem to be represented by the finds surviving from this cemetery. The tyres probably came from the excavations of 1913 and have nails with horizontal wood grain (Pl. 125B, 3–5). Sadly the nails are not preserved to their original length and it is impossible to calculate the felloe height. A Bruck construction is made likely by the surviving felloe-clamp fragments, which indicate that each wheel was fitted with more than one clamp (Pl. 125B, 6–12). Gottesberg felloes, by contrast, require only one clamp per wheel – to cover the join of the single bent felloe board.

6–7) *Ehingen-Belzheim tumulus 104 and Haldenwang*: It is again the felloe-clamps which suggest a Bruck construction for the wagon from Ehingen-Belzheim (Pl. 71A, 4–6.13.15). By contrast, a Gottesberg construction seems unlikely for the wagon from Haldenwang in view of the tyre nails which, although in no case fully preserved, appear originally to have had a length exceeding 75 mm (Pl. 75A, 4–5).

8–9) *Hohenstein-Ödenwaldstetten and Wörl*: It is impossible to reconstruct the felloe type of these wagons. A Gottesberg construction, however, is out of the question, considering that the felloes from Hohenstein-Ödenwaldstetten were at least 80 mm high, and those from Wörl measured between 78 and 103 mm in height (Pls 37D; 131B; 132A). Sadly, wood grain does not survive to document which sort of double felloe, Großeibstadt or Bruck, was used on these two wagons.

10) *Altheim-Heiligkreuztal, 'Hohmichele', grave I*: The Bruck type of felloe construction could also have been used on a wheel from 'Hohmichele' grave I. The excavator stated that the tyre found outside chamber I had nails up to 98 mm long, indicating felloes 100 mm high (Rick and Hundt 1962, 83). This would indicate a double felloe construction. Considering that the tyre was 40 mm wide, however, such a high felloe would be unlikely and the author finds Rick's observation rather doubtful.

4.3.3 The Gottesberg felloe construction

The Gottesberg felloe construction is well represented on wagons with type VII tyres. Felloe heights are known from 10 wagons with this type of tyre, varying from 48 mm (Magdalenenberg) to 68 mm in height ('Hohmichele', grave VI). But the Gottesberg construction was also used with every other tyre type, as the heights of the felloes demonstrate:

Type I tyres:	Dietfurt: 69 mm.
Type II tyres:	Poláky: 65 mm.
Type III tyres:	Gottesberg tumulus 3: 68 mm; Hradenín grave 28: 71 mm; Hohenfels: 70–80 mm.
Type IV tyres:	Klettgau-Geißlingen: 68 mm.
Type V tyres:	'Magdalenenberg': 48 mm; unprovenanced

(cat. no. 98A): 74 mm; unprovenanced (cat. no. 98B): 73 mm.

Type VI tyres:	Chouilly: 60 mm; Hermrigen: 55 mm.
Type VII tyres:	Vix: 55 mm; 'Hohmichele' grave VI: 68 mm; Hochdorf: ca. 65 mm; Kicklingen: 52 mm; Weinsfeld: 61 mm; Repperndorf: 56 mm; Býčí-skála, wheel i: 60 mm; Býčí-skála, wheel ii: 53 mm; Býčí-skála, wheel iii: 58 mm; Praha-Bubeneč: 51 mm.

It also seems probable that a Gottesberg felloe construction was used on the wagon from Bell, indicating that felloes up to 75 mm in thickness could be bent for wheels of this type (see H.-E. Joachim's reconstruction of a wheel from the Bell wagon, with a Gottesberg construction: Joachim 1987, 140, fig. 5).

The second hypothesis put forward above (p. 53) stated that all tyres measuring more than 29 mm in width must have had a single bent felloe of Gottesberg type. Taking this into account, we have a total of 56 wagons north of the Alps having felloes with a construction of type Gottesberg.

The Gottesberg felloe construction was probably also used on the wagon from Como-Ca'Morta, grave of 1928. However, since the tyres were evidently shrink-fitted to the felloe without using nails, it is impossible to calculate the felloe height. The wagon fittings include two complete felloe-clamps and a fragment of a third which, in view of the relatively complete survival of the wagon fittings, suggests that each felloe was provided with only one clamp (Pl. 134, 2). The clamps are of cast bronze and have an elaborate bifurcated form, each end being fastened by a pair of iron nails. The clamps have an internal height of 50 mm, and bear traces of horizontal wood grain imprinted in the iron rust of their nails.

4.3.4 Felloe constructions: summary

Our analysis of the three demonstrable felloe types has uncovered, for the area north of the Alps, 23 or 24 wagons with Großeibstadt felloes, two certain and four possible or probable with Bruck felloes, and 56 with Gottesberg felloes. A further three felloes are of double construction (of Großeibstadt or Bruck type) and for 12–15 felloes it was found impossible to be sure if they were of single or double-layered construction, although they were certainly made with bent felloe boards (Gottesberg or Bruck construction). However, the table on Fig. 80 shows that Gottesberg felloes were probably more common, considering that like type VII, tyres of type V and VI were apparently always used with this type of felloe construction.

Whereas there was little difficulty in recognising felloes of Großeibstadt type, with their characteristic diagonal wood grain and felloe-clamps, the identification of Gottesberg and Bruck felloes rests on the two hypotheses put forward above (p. 53). Although the identification of the latter types of felloe is therefore open to doubt, there is little to commend alternative felloe reconstructions. For example it could be suggested that felloes with heights less than 75 mm could also have had a two-layered construc-

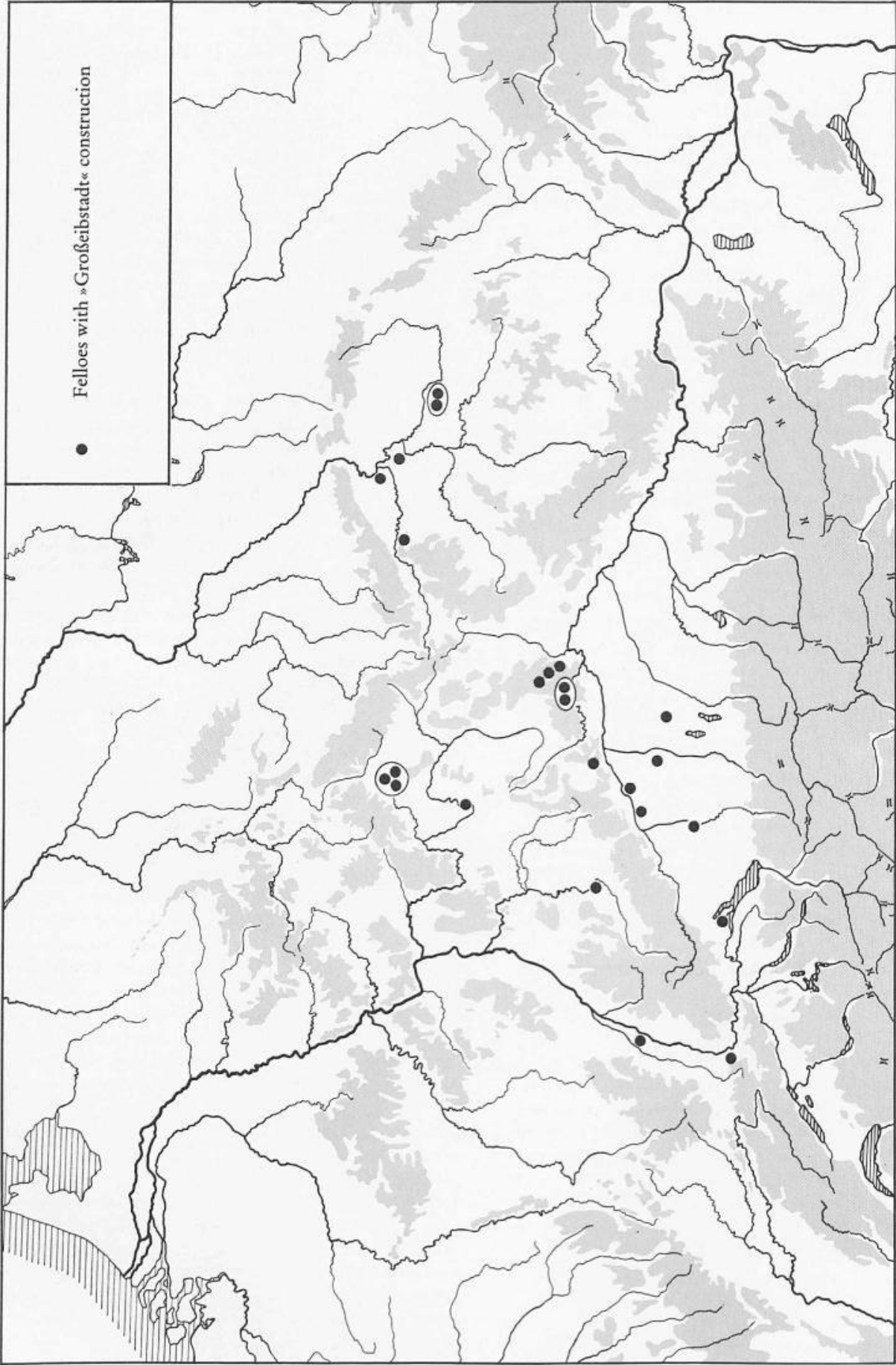


Fig. 59 The distribution of wheels with the Großfeibstadt felloe construction.

tion. They could either have had two thin bent felloe boards, or an inner felloe composed of a single bent board and an outer felloe composed of several bent felloe segments. However, one would expect such felloes to be provided with numerous felloe-clamps, whereas wheels with felloes less than 75 mm high have never been found with more than one clamp per wheel. Another suggestion was put forward by K. Spindler for the wagon from the 'Magdalenenberg' near Villingen-Schwenningen. Spindler thought that the felloes from the 'Magdalenenberg' were of single-layered type, but composed of several bent segments, probably four (1971, 37). He drew this conclusion from the form of a felloe fragment on which one end was preserved, apparently from a blunt join (*ibid.* 1971, pl. 6, 3). However, there seems to be no reason why this fragment could not come from the blunt join of a single bent felloe board of Gottesberg type.

A more serious problem is posed by the great variety of nailing used on felloes of Gottesberg type. The graph on Fig. 52 highlights three main types of tyres and nailing: (1) wide tyres with nails spaced more than 100 mm apart, (2) narrow tyres with nails spaced more than 100 mm apart, and (3) narrow tyres with nails spaced less than 100 mm apart. In particular, it is the tyres of type V, with nails spaced on average 30–60 mm apart, which raise doubts. It is not clear why so many nails were required, either to fasten the tyre to the felloe or to hold the felloe together – particularly because the felloes in question always seem to have been of Gottesberg type. Indeed, there remains a suspicion that these tyres represent a more complex type of felloe construction. On the other hand, the closely spaced nails could be explained by the typological derivation of type V from type I tyres: the closely-spaced nails may originally have served to hold together the composite Großebstadt felloes typical for type I tyres, then being retained as a typological survival on the tyres of type V. Alternatively, the closely-spaced nails of type I and V tyres could have been required to hold on tyres which had been fitted to the felloes cold, whereas the other tyre types could have been fitted hot and shrunk onto the felloes, rendering close-set nailing unnecessary.

It is interesting to note the use of Großebstadt, Bruck and Gottesberg felloes in Sesto-Calende and Como-Ca' Morta, suggesting that the Golasecca culture experienced a process of wheel development in parallel with the area north of the Alps. Sadly, it was not possible to reconstruct the felloe of the wagon from Sesto-Calende grave A. Here the tyre nails are spaced 50–55 mm apart and the shafts survive today up to 60 mm long. Biondelli (1867, 7) remarked that, in his day, the nails reached up to 80 mm

in length. Perhaps this documents a double felloe (type Großebstadt or Bruck?), but it is impossible to reach any definite conclusions.

It is instructive to compare the distributions of the wagons with the various felloe constructions. It is predictable that the wagons with Großebstadt felloes, restricted to Ha C, are concentrated in South Germany and Bohemia (Fig. 59). The Gottesberg felloes, in contrast, were apparently used over the whole wagon-grave distribution, both in Ha C and Ha D.

It remains to mention the exceptional felloes of the wagons from Wehringen, 'Hexenberg', tumulus 8 and Somlóvásárhely. The Wehringen wagon was not provided with tyres or tyre nails, and it is fortunate that two fragments of the wooden felloes have survived (Pl. 97A). The fragments were found *in situ* by the north-east wheel, and described an arc about 750 mm in diameter (Figs 200–201). The felloes were decorated with hemispherical bronze knobs, each 16–17 mm in diameter, provided with a nail which projected about 15 mm into the felloe; the knobs were spaced about 22 mm apart. The felloe fragments are not well preserved, and are somewhat distorted and shrunken. However, the bronze knobs seem to sit in a row above a slight step in the felloe surface. Whether the knobs were applied to the felloe on a decorative wooden strip, or whether the felloe was made from two pieces of wood joined together is not clear. Nevertheless, it is beyond question that the felloes were partly made of bent oak wood, and in our discussion of the late Urnfield Bad Homburg group of fittings it was suggested that a complex construction could have been used, possibly resembling the Großebstadt type (Ch. 3.6).

The only wagon fittings in the grave from Somlóvásárhely were tyres and tyre nails. Neither the tyres with their curved cross-section, nor the nails which are round in cross-section with countersunk or slightly protruding heads, can be accommodated in the tyre and nail typologies outlined above. The same is true for the felloe construction. The tyres are ca. 35 mm wide and had nails spaced 120–210 mm apart which, according to the second hypothesis (p. 53), would suggest a Gottesberg felloe construction. On the contrary, the shafts of the tyre nails survive up to 175 mm in length. Considering that the tyres indicate a wheel diameter of about 680 mm, it is clearly impossible to reconstruct the wheels like those of the wagons north of the Alps. It seems that the wheels from Somlóvásárhely were not made with spokes and felloes and one can only suggest that they were disc wheels – although their detailed construction is unknown because no wood grain is preserved on the tyres and nails.

CHAPTER 5

The Hallstatt Wagon: classification of the naves

The naves of Hallstatt period wagons were often provided with iron or bronze fittings which can be divided into numerous typological groups (reconstructions are shown on Figs 60–64). The wide variety of nave types suggests that this part of the wheel was of critical importance for the functioning of the wagon and required constant development. For this reason the nave fittings are of great value for a fine typological classification of the wagons and are useful both for recognising regional workshop groups and for detecting developments in wagon construction. To economise on space, the nave types are sometimes referred to by the numbers of the sections in this chapter (for example Figs 84–85: e.g. type 3 = type Breitenbronn; type 11 = type Vilsingen).

5.1 TYPE WEHRINGEN

Each of the naves from Wehringen, 'Hexenberg', tumulus 8 (Fig. 60, 145) was fitted with a pair of slightly conical cast bronze cylinders, 103–115 mm long. The cylinders were cast with three or four groups of three ribs, and the outer end of the cylinder was provided with a flange (Pl. 95B). The nave-stock probably had a larger diameter than the cast bronze cylinders, and was fitted with ribbed bronze bands, fastened by nails (Pl. 96, 1–10). It is interesting that the naves were also provided with numerous small bronze 'wedges' (Pl. 96, 24). These were fitted inside the cast bronze cylinders, at the end near the nave-stock. Their function is uncertain, but it is most likely that they wedged the cast cylinders tightly onto the wooden nave.

Although this kind of nave is unique in the Hallstatt period, it has parallels among the fittings of the late Urnfield period Bad Homburg group, which was described in Ch. 3.6. The closest parallel comes from the hoard of Weinheim-Nächstenbach, Kreis Mannheim (Fig. 40, 1). The hoard contains two fragments of a similar cast bronze cylinder, which measured about 100 mm in length. The outer end of the cylinder has a flange, in this case with a step in the profile. The cylinder, like two of the examples from Wehringen, has four groups of three ribs: here, however, the middle rib of each group is slightly wider and higher than the ribs to either side. Another parallel comes from the hoard of Vénat, dép. Charente, in this case damaged by fire (Fig. 43, 1). The cast bronze cylinder fragment bears ribs similar to those on the fragment from Weinheim-Nächstenbach, with a larger middle rib and smaller ribs to either side. The

Vénat hoard contains another cast bronze fragment which may also come from a nave (Fig. 43, 2), in this case with a group of three equal sized ribs, as on the naves from Wehringen.

Further fragments of ribbed cast bronze, probably from naves, come from the following hoards: Bad Homburg (Figs 37, 5; 38, 1), Saarlouis (Fig. 44, 2), Neuvy-sur-Barangeon, 'Petit-Villatte' (Fig. 41, 1) and Launac (Fig. 44, 1). Another fragmentary example of this type of nave, sadly unprovenanced but probably from West Europe, is housed in the Römisch-Germanisches Zentralmuseum, Mainz (Fig. 44, 3); the hoard of Larnaud may contain another fragment (Cordier 1985, 311).

The naves of type Wehringen are distributed in Western Europe (France and the Rhineland; for the Urnfield examples see Fig. 22). The example from Wehringen is exceptional, not only because it comes from a grave of the Hallstatt period, but also because it is located further to the east, in Bavaria.

5.2 TYPE LENGENFELD

Naves of type Lengenfeld were fitted with simple bronze nave-caps. The nave-caps are flat, with a circular axle-channel and a rounded outer edge. They were fastened to their wooden naves by numerous bronze nails. This type of nave-cap was apparently found in two graves from the Oberpfalz, Beratzhausen grave 3 (Pl. 63, 1–2.5–6.9–10) and Lengenfeld tumulus of 1870 (Pls 92; 93, 1–2). It has been suggested that the finds from these two graves are mixed with each other, arousing the suspicion that the surviving nave fragments could come from just one wagon. But it is difficult to imagine how the grave groups could have become mixed, considering that the Lengenfeld finds were excavated in 1870, and the Beratzhausen finds were first documented when they reached the Regensburg museum in 1894. Furthermore the Lengenfeld nave-caps, measuring 130–140 mm in diameter, are smaller than those from Beratzhausen, the surviving fragments of which indicate a diameter of about 160 mm. While both graves certainly contained wagons (remains included tyres, linchpins etc.), the nave-caps constitute the only nave fittings.

It is impossible to be certain about the original appearance of these naves. However, the nave-caps seem to have been fitted to a large flange at the end of the nave, possibly suggesting a shape resembling the Wehringen type.

5.3 TYPE BREITENBRONN

Naves of type Breitenbronn have been found on 15 wagons, and the type is probable on one further example. The type is named after the grave from Breitenbronn in North Baden (Pl. 26, 13–15.17–19), where the original shape of the nave can be reconstructed reliably (Fig. 60, 47). The iron nave fittings comprise a nave-cap, a nave-head ring and a cylindrical nave-neck sheathing. The nave-neck was simply bound with a broad band of iron sheet which was overlapped and fastened to the wooden nave by three nails (Pl. 26, 13). The nave-head ring is angular in cross-section, with both edges bent down, and covers the gap between the nave-neck sheathing and the nave-cap (Pl. 26, 14–15.18–19). The nave-cap is the most characteristic feature of the Breitenbronn type: it is conical in shape and is normally decorated with a single rib. The front of the nave-cap is bent to form a flat circular disc which is perforated by the axle-channel.

Although all the naves of this type have roughly the same shape, they are by no means identical. Thus on the example from Breitenbronn, the nave-cap is made from two pieces of iron sheet, whereas normally the nave-cap is hammered out in one piece. The Breitenbronn type is documented in two other cemeteries in Baden-Württemberg, Tannheim and Geißlingen; another example is very probably furnished by the nave fittings from Gündlingen.

The naves from Geißlingen (Fig. 60, 76), with their cylindrical necks and enlarged profiled heads, conform to the Breitenbronn type. The nave-cap is again conical in shape and bears a single raised rib (Pl. 43A, 3). However, in this case the nave-cap and nave-head ring are made in one piece and the iron sheet of the outer face of the nave-cap has been bent inwards to form a lining for the outer 17 mm of the axle-channel.

The examples from Tannheim tumuli XVI and XXI (Fig. 60, 93D.93E) are similar. Once again the nave-cap and nave-head ring were made in one piece (Pls 51B, 1–2; 51C, 1). The Tannheim naves differ from the Geißlingen examples because the nave-cap was not bent inwards to line the end of the axle-channel.

The nave fittings from the 'Zwölferbuck' near Gündlingen have not survived, and it is only possible to reconstruct their original form from drawings by W. Rest. Rest offered two alternative reconstructions, one by the Karlsruhe museum (Pl. 32B, 1), the other by Rest himself (Pl. 32B, 10), neither of which is convincing. Instead it seems more likely that the fittings should be reconstructed like the Breitenbronn nave type. In Rest's reconstructions the nave-head fittings appear mistakenly to have been fitted to the nave-stock.

The Breitenbronn type is more frequent in Bavaria, being represented in seven graves. In Niederhofen tumulus 4 (Fig. 60, 132), the nave-head ring and nave-cap are made in one piece. The nave-cap is again conical in shape and provided with a single raised rib (Pl. 87A, 1–2). The nave-neck sheathing is not well preserved but had the cylindrical form typical of the Breitenbronn type (Pl. 87A, 5–7.9–10). In the case of Belzheim tumulus 104

(Fig. 60, 112A), the normal shape of the Breitenbronn nave is reproduced. Here the nave-head ring was made separately and joined the nave-neck sheathing and the nave-cap (Pl. 71A, 1–2). The nave-neck sheathing is only preserved in a few fragments, but apparently had a cylindrical form. The author was not able to study the nave fittings from Leipheim tumulus 14 (Fig. 60, 125), except for a fragmentary nave-neck sheathing (Pl. 83A, 1). However, in Kossack's publication of the nave fittings the Breitenbronn type is immediately recognisable (Pl. 83A, 2). In this case it is not clear if the nave-head ring was made separately or if the nave-head fittings were made in one piece.

Only the nave-cap survives, in fragments, from Emmerting-Bruck (Pl. 72, 2), with the ribbed conical form of the Breitenbronn type. On this nave the nave-head ring and the nave-cap were probably made separately. The nave fittings from Hohenfels, 'Haidensbuch', tumulus II have not survived, but sketches in the museum inventory book clearly show the Breitenbronn type (Pl. 79A, 5–6). The nave fittings from Beilngries, 'Im Ried-West', grave 74 (Fig. 60, 106B) are similar to those from Breitenbronn, with a nave-head ring and a nave-cap made in two parts (Pl. 62, 2–3). The nave-neck sheathing survives in fragments, one of which shows the join of the broad iron band, fastened by two iron nails (Pl. 62, 2).

The Breitenbronn nave type has been found once more in Beilngries, in grave 128 from the cemetery 'Im Ried-Ost'. Two fragments from the nave have survived (Pl. 61, 3.6). In this case, like Breitenbronn and Beilngries, 'Im Ried-West', grave 74, the nave-cap is made in two parts. The end of the nave was provided with a simple iron disc, one side of which was bent inwards to line the axle-channel (Pl. 61, 6). The ribbed conical cap of the nave-head probably fitted under the thickened outer rim of the iron disc (Pl. 61, 3). The nave-head ring and the ribbed conical part of the nave-head of this nave were made in one piece.

Breitenbronn naves were found in two graves in Straškov, Bohemia. On account of the tyres and fellow fittings, two wagons seem to be represented by the finds from this cemetery, from the excavations of 1911 and 1913. I believe that the naves with flat nave-head rings (Pl. 125B, 1–2) may be assigned to the tumulus of 1913, in which case the naves with undulating nave-head rings (Pl. 125A, 1–4) would come from the tumulus of 1911 (see catalogue).

Vikletice grave 138 contained a small iron fragment which appears to come from a Breitenbronn nave (Pl. 127B, 2). The fragment seems to derive from the nave-head, with a small piece of the nave-head ring and a piece of the nave-cap being recognisable. Although it is not completely certain that the fragment came from a Breitenbronn nave the author regards this as probable, particularly considering the traces of wood grain which would correspond to that expected on a nave-head ring of Breitenbronn type.

The last example of the Breitenbronn type comes from the Býčí-skála cave (cat. no. 148/v). The author was not able to study these fittings, which are in the museum in

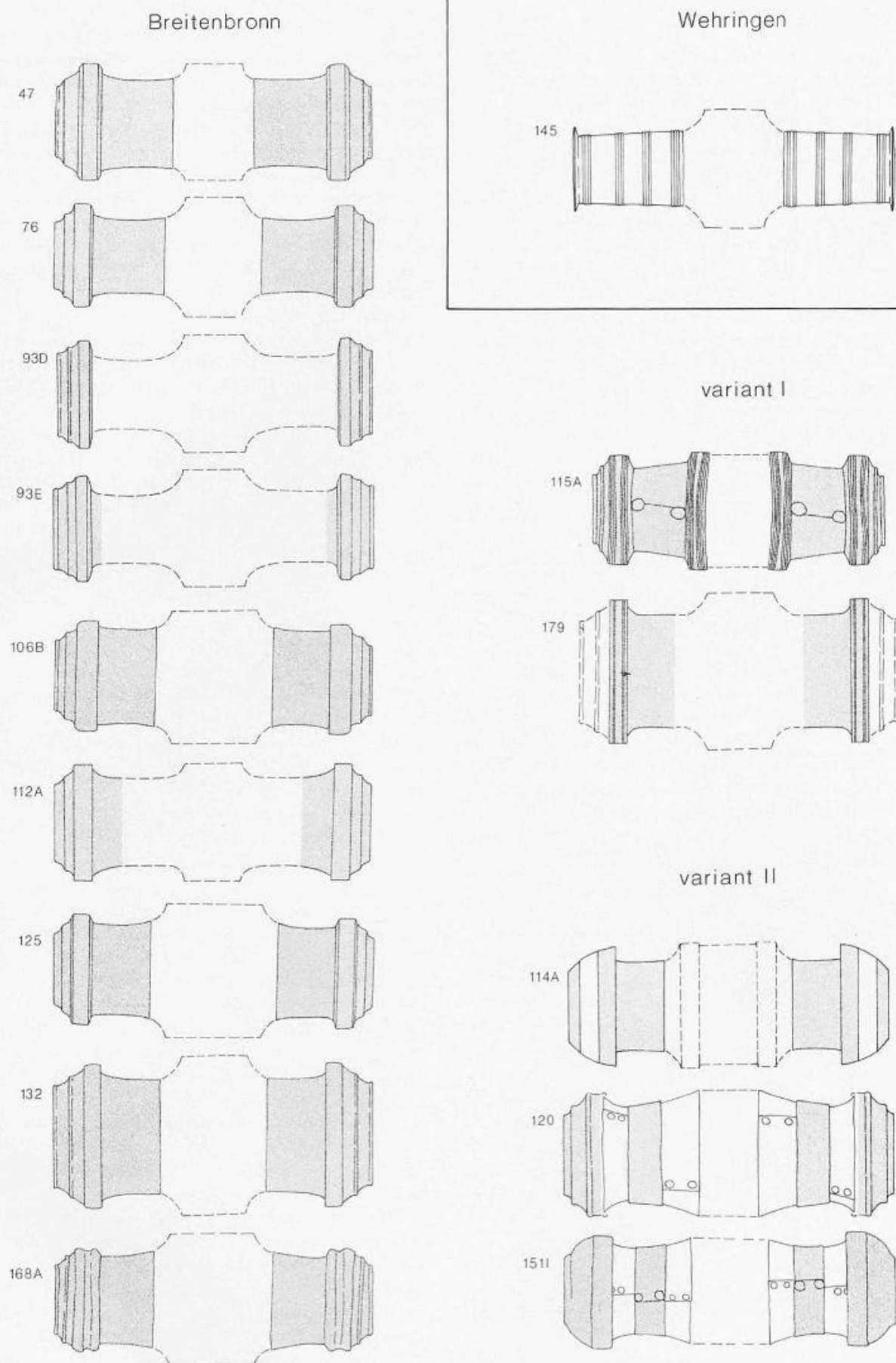


Fig. 60 Suggested reconstructions for the naves of types Wehringen and Breitenbronn. Iron is stippled, bronze is white. — Scale 1:6.

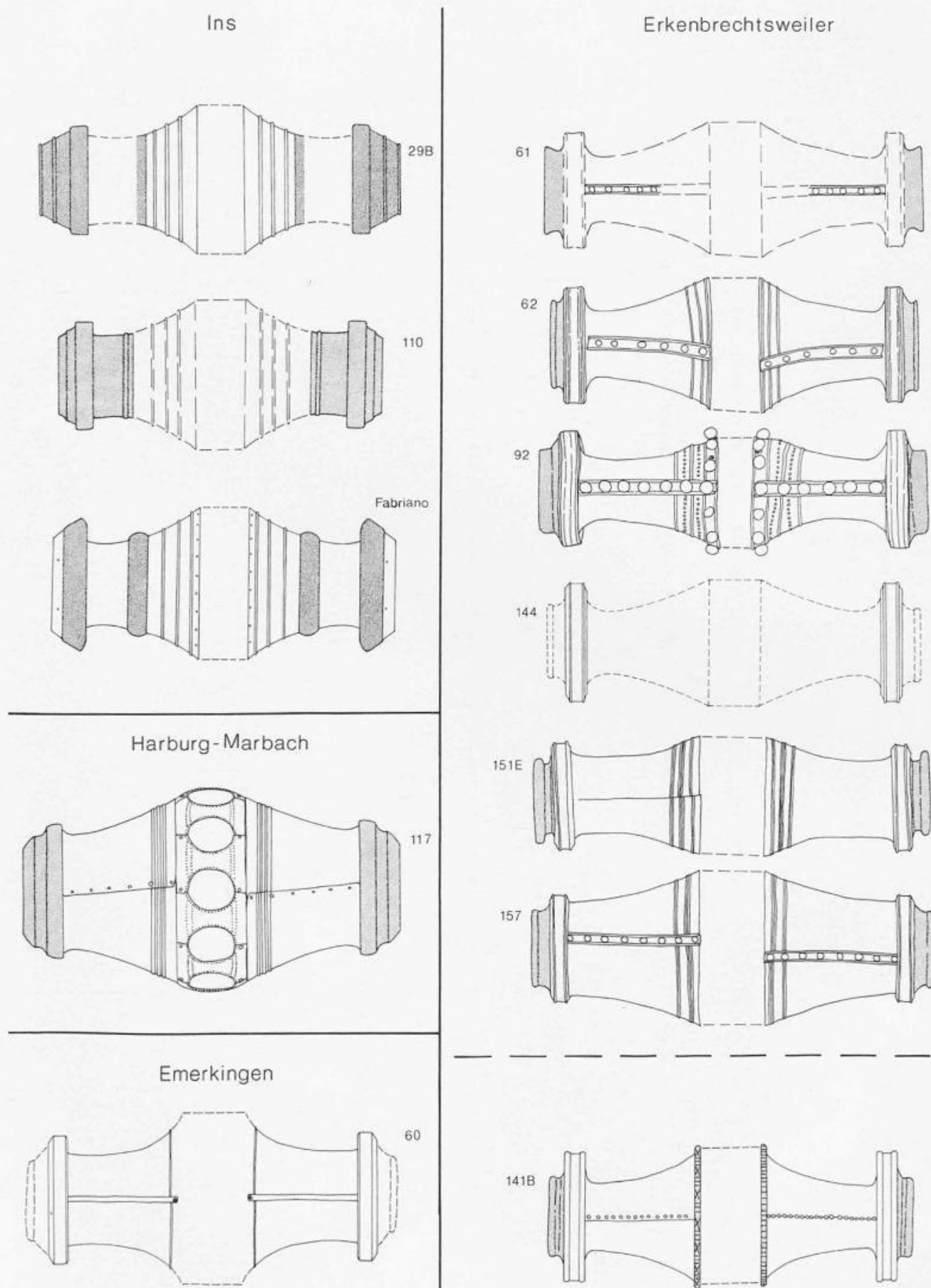
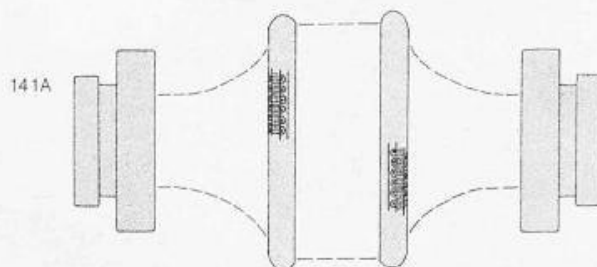
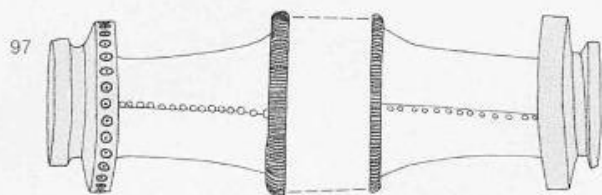
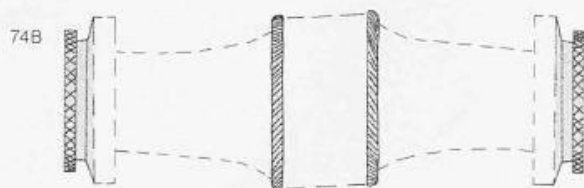
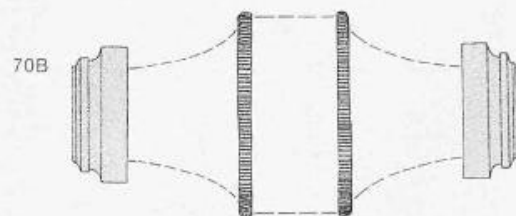
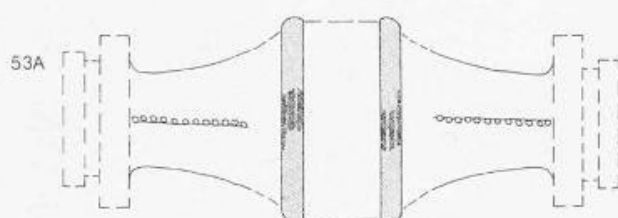
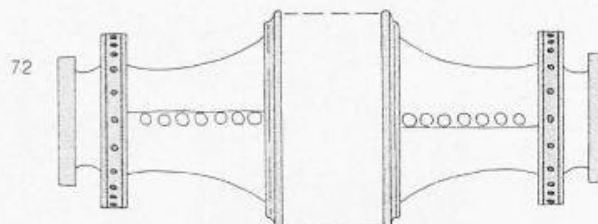
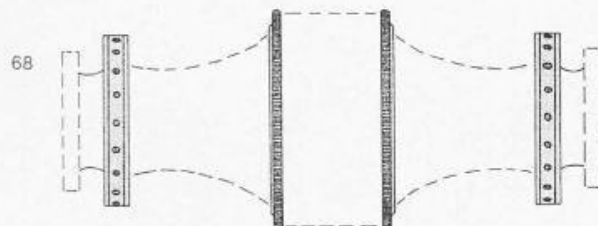
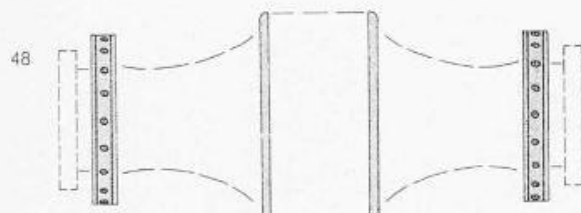


Fig. 61 Suggested reconstructions for the naves of types Ins and Erkenbrechtsweiler, and the naves from Harburg-Marbach and Emerkingen. Iron is stippled, bronze is white. — Scale 1:6.

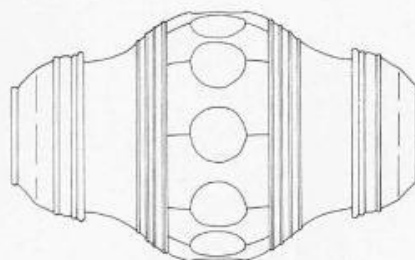
Winterlingen



Vilsingen



Ca' Morta



Vix

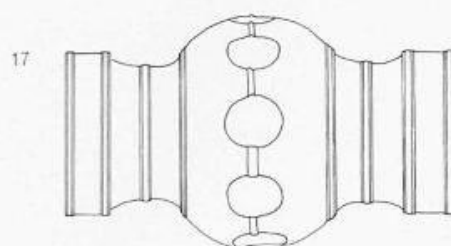


Fig. 62 Suggested reconstructions for the naves of types Winterlingen and Vilsingen and for the naves from Como-Ca' Morta and Vix. Iron is stippled, bronze is white. — Scale 1:6.

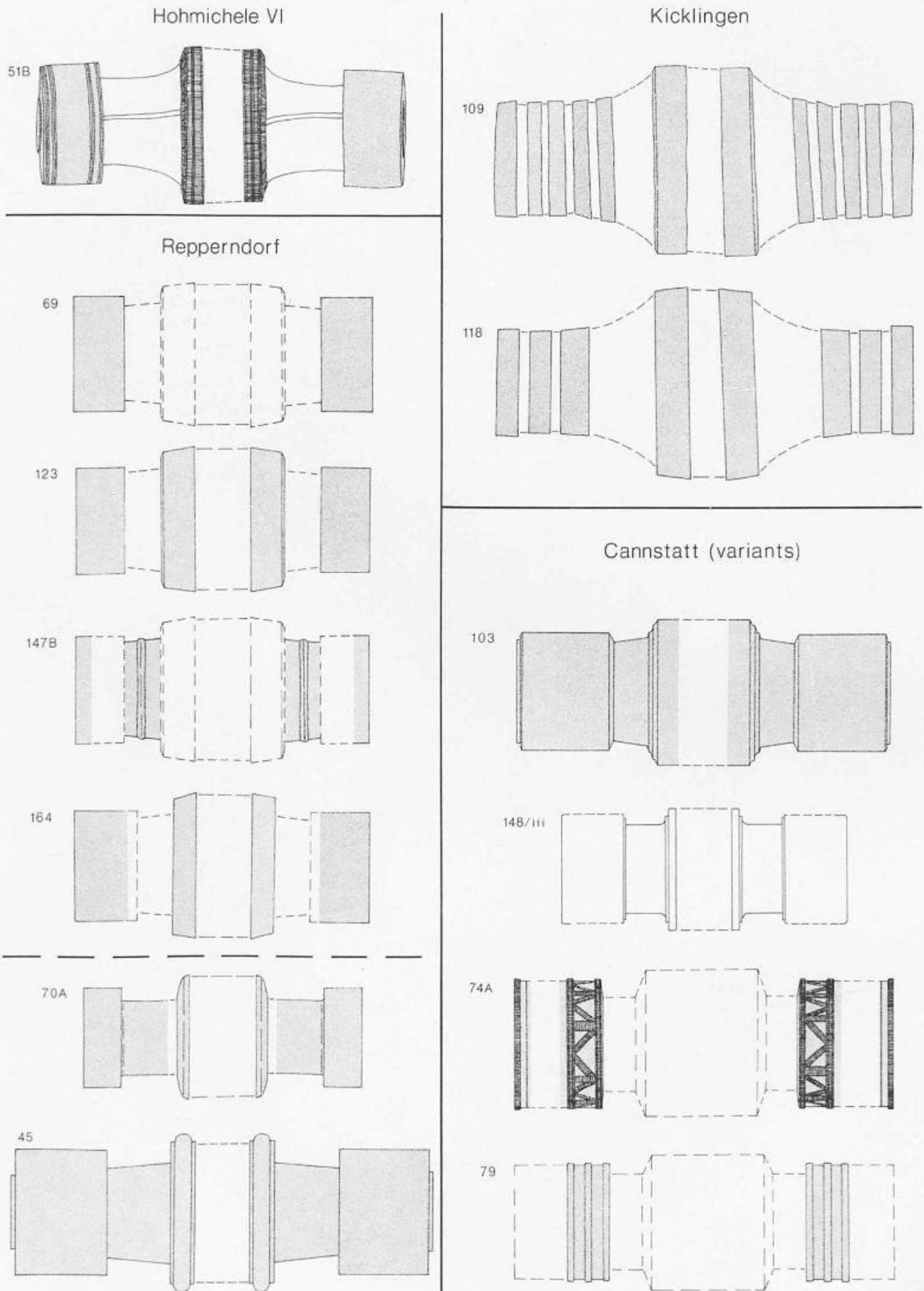


Fig. 63 Suggested reconstructions for the naves of types Repperndorf, Kicklingen and Cannstatt, and the nave from Hohmichele grave VI. Iron is stippled, bronze is white. – Scale 1:6.

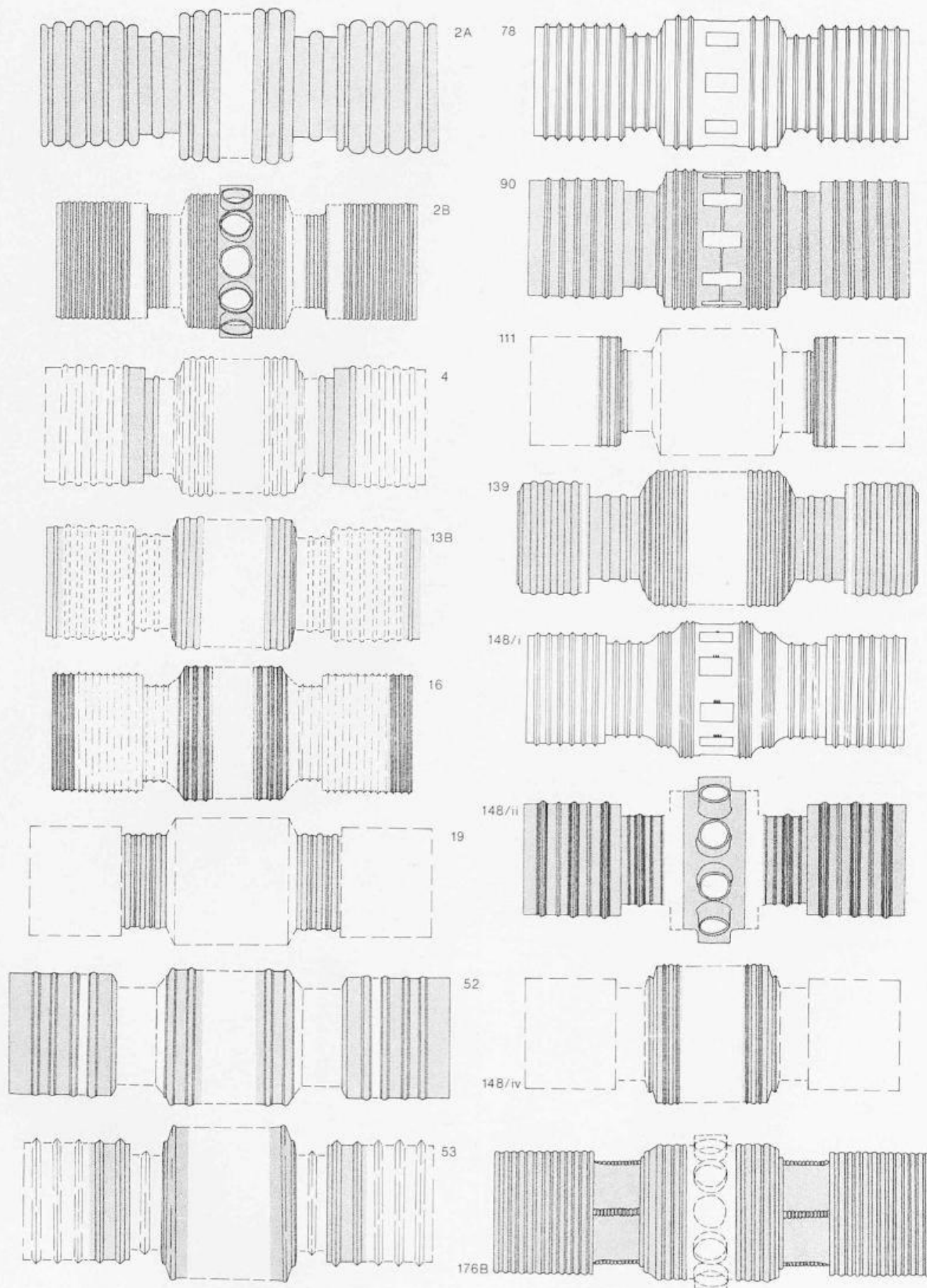


Fig. 64 Suggested reconstructions for the naves of type Cannstatt. Iron is stippled, bronze is white. – Scale 1:6.

Brno, but F. E. Barth kindly made his own drawings available (Pl. 105, 2). The museum has 19 fragments of ribbed conical iron objects which very probably come from Breitenbronn naves. These fittings may be somewhat atypical, because the ends of the nave seem to have been fitted with iron discs which were covered by the outer edge of the nave-caps (see cross-section, Pl. 105, 2).

5.3.1 *Variants of the Breitenbronn nave type*

Variant I: The naves from Salzburg-Taxham (Fig. 60, 179) and Großebstadt, cemetery II, grave 2 (Fig. 60, 115A) differ slightly from the 16 naves described above. While the nave from Salzburg-Taxham has the typical nave-neck and nave-cap, the nave-head ring is decorated with two sets of double engraved lines (Pl. 131A, 1–2). Similar decoration is found on the Großebstadt nave-head ring, here with two sets of three engraved lines (Pl. 74B, 1). The Großebstadt nave is also different in having a nave-stock ring which, like the nave-head ring, is decorated by two sets of three engraved lines. But the Großebstadt nave still retained the typical ribbed conical nave-cap and cylindrical nave-neck which, like Salzburg-Taxham, indicates its close relationship to the Breitenbronn type.

Variant II: The naves from Gehrsricht tumulus 2 (Fig. 60, 120) have the typical ribbed nave-cap of the Breitenbronn type, and a nave-head ring which is likewise analogous to those on the Breitenbronn naves (Pl. 77B, 1–2.6). The nave-neck, however, is different, with a waisted, spool-like shape, made from two bronze sheet bands and a central iron sheet band. The same type of nave-neck is seen on the naves from Hradenín grave 46 (Fig. 60, 151I). The Hradenín nave also has a nave-head ring like those on the Breitenbronn naves, but the nave-cap is quite different, with a hemispherical shape rather than the typical conical ribbed form (Pl. 113, 1). The same domed, hemispherical nave-heads are found on the naves from Großebstadt, cemetery I, grave 1 (Fig. 60, 114A) and cemetery II, grave 14. The exact construction of the the nave-head from grave II/14 is, as yet, unclear but on the nave from grave I/1, the nave-head is composed of two iron bands and an intervening bronze band (Pl. 73, 4). However, both these Großebstadt naves have the simple cylindrical nave-neck sheathing typical for the Breitenbronn type. These four naves do not form a uniform group, but are nevertheless all related to the Breitenbronn type: they are united by having a more elaborate construction entailing bronze, contrasting with the exclusive use of iron on the typical Breitenbronn naves. The four naves seem to form an interrelated group, with the elaborate nave-necks held in common by the Gehrsricht and Hradenín naves and domed nave-heads held in common by the Hradenín and Großebstadt naves.

The Breitenbronn type is distributed in South Germany and Central Bohemia, as are variants I and II (Fig. 67). The only exception is formed by the nave fragments from the Býčí-skála cave in Moravia.

5.4 NAVES WITH IRON NAVE-HEAD RINGS BUT WITHOUT NAVE-CAPS

Five naves have nave-head rings similar to those used on Breitenbronn naves, but lack any form of nave-cap. Dietfurt, 'Tennisplatz', grave 31 contained the only wagon on which naves of this sort were also provided with nave-neck fittings; in this case the nave-neck fittings were of the same type as on Breitenbronn naves: a simple cylindrical shape with one end everted (Pl. 64, 20–22). The Dietfurt nave-head rings had the same angular cross-section as those on most of the Breitenbronn naves (Pl. 64, 15–19). But on this wagon the nave-head rings bear an elaborate dentate decoration which has not been found on the Breitenbronn type. Two other recently excavated wagon-graves lacked both nave-neck sheathings and nave-caps. On the wagon from Belzheim tumulus 109 the nave-head rings had the normal angular profile (Pl. 71B, 12–15), those from Wehringen, 'Hungerbrunnenmähder', tumulus 1, however, had a curved cross-section (Pl. 97B, 4–5.10).

In the case of Blotzheim, on the other hand, considering that the grave was probably robbed, the fact that the nave-head ring was the only nave fitting discovered in the grave does not rule out the possibility that nave-neck sheathings or nave-caps could originally have been present. However the surviving fragment is so small that it is even doubtful whether it can definitely be interpreted as a nave-head ring (Pl. 8B, 5).

The recently excavated Mitterkirchen, tumulus II, grave 1 also had nave-head rings with an angular cross-section, but here some wood has survived from the nave-head (Fig. 65, 1). On each side of the nave-head ring the wooden nave-head clearly sloped downwards in a gentle curve, showing that the shape of the nave-head probably resembled that of the Breitenbronn nave type.

All five of these naves are related to the Breitenbronn type, and should probably be reconstructed, like them, with a cylindrical nave-neck and enlarged nave-head. Indeed, these six wagons show that nave-neck sheathings and nave-caps could be dispensed with.

The naves with nave-head rings but no nave-caps were found in Bavaria and Upper Austria (Fig. 67).

5.5 NAVES WITH IRON NAVE-STOCK RINGS AND NAVE-NECK SHEATHINGS

It is fortunate that in all three cases where this type of nave construction is attested there are grave plans available to show that the nave-stock ring was indeed fitted to the nave-stock and not to the nave-head (see Figs 175; 185; 206). In the case of Tannheim tumulus VI the nave-stock rings preserve traces of wood (Fig. 65, 2) showing that on one side of the iron band the nave sloped down towards the nave-neck, and on the other side the nave continued with the same diameter as under the iron band (Pl. 51A, 1–3). The fittings from Hradenín grave 24 suggest a similar reconstruction, considering that one side of the nave-stock ring is bent inwards, indicating that the

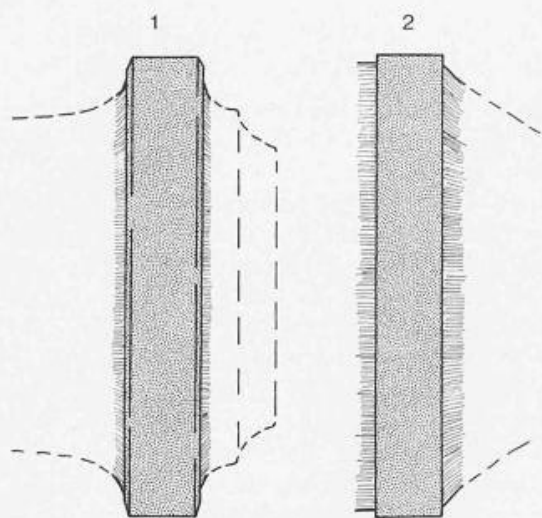


Fig. 65 1 Iron nave-head ring from Mitterkirchen, tumulus II, grave 1, showing the profile of the wood grain surviving on each side; 2 Iron nave-stock ring from Tannheim, tumulus VI, showing the profile of the wood grain surviving on each side. — Scale 1:2.

wood of the nave sloped downwards towards the nave-neck sheathing (Pl. 109, 3.4–5). According to the plan of Großeibstadt, cemetery I, grave 4, the naves should likewise be reconstructed with a narrow nave-stock ring and a broad nave-neck sheathing (Pl. 74A).

The naves of the wagon from Reichenau tumulus B were also provided with simple iron bands. In this case each nave was probably fitted with a pair of narrow iron bands ca. 18 mm wide and ca. 160 mm in diameter and a pair of broader iron bands (Pl. 46B, 3) ca. 36 mm wide and ca. 130 mm in diameter. It is possible that the narrower band could have been used on the nave-stock or the nave-head, and the broader band as a collar on the nave-neck. However, the diameter of the broader band seems too large, and it seems too narrow to have fitted on the nave-neck. It is therefore impossible to suggest a reliable reconstruction for the naves of the Reichenau wagon.

Naves with nave-stock rings and nave-neck sheathings have been found in South Germany and Central Bohemia, in rich cemeteries of the older Hallstatt period (Tannheim, Großeibstadt, Hradenín: Fig. 67).

5.6 TYPE INS AND RELATED NAVE FRAGMENTS

The naves of this type have not survived well and only two, from Fabriano and the lower grave of tumulus VI of 1848 from Ins can be satisfactorily reconstructed (Fig. 61, 29B, Fabriano). The nave-head from Ins is exactly like the Breitenbronn naves, with a nave-head ring and a ribbed conical nave-cap (Pl. 24C). The nave-neck, however, is quite different. On the Ins nave only part of the nave-neck sheathing survives, from the end near the nave-stock. This part of the nave-neck curved smoothly towards the nave-stock and was covered by a broad band

of bronze sheet decorated with three ribs. The front part of the nave-neck was clearly covered with iron sheet, as traces of corroded iron on the edge of the bronze band show.

The nave fittings from Fabriano, S. Maria in Campo tomba 3 correspond closely to those from Ins (Fig. 113). A conical bronze sheet band with three ribs is followed by a thick iron ring and a cylindrical bronze sheath. The iron nave-head ring differs slightly from the Ins example, and the nave-cap seems to have been made of bronze.

A very similar bronze band, likewise decorated with three ribs, was found in Dýšina tumulus 2 (Pl. 108A). No other wagon parts have survived from this grave, and it is impossible to be sure of the original form of the nave, but the Ins type is the only form of nave on which this sort of bronze band has been found.

A reconstruction like Ins and Fabriano is also most likely for the nave fittings from Dittenheim (Fig. 61, 110). Once again the nave-head is formed like the heads of the Breitenbronn naves (Pl. 69, 1–2). The front part of the nave-neck was fitted with an iron band, one edge of which was ribbed (Pl. 69, 5.8). On the underside of this edge, one of the fragments of iron band has a small piece of bronze sheet, clearly indicating that the rest of the nave-neck was covered with bronze sheet (Pl. 69, 5). A fragment of bronze sheet probably comes from the conical nave-neck sheathing (Pl. 69, 3), apparently showing remains of two ribs, with a field of smooth bronze sheet between them.

Less survives from the naves of the wagon from Ohnenheim. Two fragments of ribbed iron sheet probably come from the nave-neck (Pl. 10E, 7–8) and both have small fragments of bronze sheet on their undersides. These fragments seem comparable with the nave-neck fittings from Dittenheim, where the iron sheet was also ribbed and one piece had traces of bronze sheet on its underside (Pl. 69, 5), indicating a nave-neck sheathed with both metals. It is only with caution that the Ohnenheim fragments can be grouped with the Ins type.

The wagons from Birmenstorf and Švihov-Červené Poříčí both had ribbed bronze sheet nave fittings (Pls 24B, 8–9; 126B, 1). However, in both cases too little survives to be sure whether the naves were of type Ins or of conical type (the naves are discussed again in Ch. 5.12).

The nave fittings from Lhotka may be related to type Ins. It is sadly impossible to be certain about the reconstruction of the naves from this wagon because very few of the fittings have survived. Most important is a conical collar of iron sheet with three ribs, doubtless from the nave-neck, of which only a drawing survives (Pl. 117, 5). This fitting seems similar to the conical bronze sheet collars on the naves from Ins, Fabriano and Dýšina, and may provide a parallel for the ribbed iron sheet from Ohnenheim. A number of fragments of bronze sheet bands may also come from the nave-neck (Pl. 118, 1–5). The nave-head seems to have been fitted with a narrow iron band about 140 mm in diameter (Pl. 117, 8). Whether the Lhotka naves originally had ribbed conical nave-caps like the Ins and Dittenheim examples is unknown.

It is unclear how the naves from Oberjettingen tumulus 3 should be reconstructed. The nave-head seems to be similar to the Breitenbronn type (Pl. 41B, 2). But the nave also had a broad ribbed iron band which was presumably fitted to the nave-neck (Pl. 41B, 1.3). It is impossible to calculate the original diameter of the ribbed iron band but it could have been fitted, like the bands on the naves from Gehrrecht and Hradenín grave 46, to the nave-neck (Fig. 60, 120.151I). However, the undersides of the Oberjettingen ribbed bands are completely covered by traces of wood grain, suggesting that the nave-neck did not have the bronze bands seen on the Gehrrecht and Hradenín naves.

5.7 THE NAVE FROM HARBURG-MARBACH

In varying degrees all the naves described above, in Ch. 5.4–6, are related to the Breitenbronn type. While the same can be said for the nave from Harburg-Marbach (Fig. 61, 117), its close links to the conical naves, described below, afford it a mixed or transitional character (Pl. 75B, 1). Specifically, it is the nave-head which recalls the Breitenbronn type: it was made in one piece and, although it has a slightly unfamiliar form, the shape recalls the Breitenbronn examples. The form of the nave-neck is quite new, much larger than on the Breitenbronn type, and its pronounced conical shape is sheathed in bronze. As on the fittings from Dýšina, Ins, Fabriano and Lhotka, the nave-neck sheathing from Harburg-Marbach is decorated with three ribs near the nave-stock. The nave-neck sheathing is made from a single piece of bronze sheet, which was overlapped and fastened to the wooden nave by iron nails. The nave-stock was completely covered by a series of 'I'-shaped bronze sheets, each with a semicircular opening on either side, forming 10 slightly oval apertures for the bases of the spokes.

5.8 TYPE ERKENBRECHTSWEILER

The Erkenbrechtsweiler type employs a construction not dissimilar to the Breitenbronn naves, using a nave-cap which is often conical in shape, a nave-neck sheathing, and a nave-head ring covering the gap between the nave-neck and nave-cap. The Erkenbrechtsweiler naves also have the enlarged head characteristic of Breitenbronn naves. Nevertheless, the Erkenbrechtsweiler naves form a distinct type within the broader category of conical naves. The nave-head ring is always made of bronze sheet, and the nave-neck is covered by a conical bronze sheet sheathing.

The naves from Erkenbrechtsweiler tumulus X (Fig. 61, 62) can be reliably reconstructed from their well-preserved fittings. The iron nave-caps are conical in shape with a thickened outer rim (Pl. 34, 2–5). Unlike the Breitenbronn type, they are not decorated with an

additional raised rib. Two different patterns of nave-head ring were used on the Erkenbrechtsweiler naves, one (Pl. 34, 2–3) with a simple angular profile, decorated on the outside with two pairs of engraved lines. The other pattern (Pls 33C, 3–4.8; 34, 4–5) has a similar angular profile, but in this case with the corners accentuated by raised ribs. The nave-neck was covered by a single piece of bronze sheet bent into a conical shape, with the outer end curving outwards to fit under the nave-head ring. The nave-neck sheathing was overlapped, the join being covered by a strip of bronze sheet, along either side of which ran a raised rib (Pls 33C, 6; 34, 2–5). The seam of the nave-neck was held in place by a row of iron nails with spherical bronze heads. The end of the nave-neck sheathing closest to the nave-stock was decorated with three ribs (Pl. 34, 3–5), or alternatively with two single ribs and a third double rib (Pls 33C, 7; 34, 2).

The naves from Sulz am Neckar (Fig. 61, 92) are made in the same way (Pl. 49). Again the nave-head rings bear engraved lines, and the seam of the nave-neck sheathing is covered by a strip of bronze sheet with either side raised into a rib. The end of the nave-neck sheathing is again provided with ribbed decoration. On these naves, however, the nave-neck sheathing has two seams, each of which is fastened by iron nails with very large spherical bronze heads. This sort of nail is also used to secure the inner rim of the nave-neck sheathing. The Sulz naves also have point-boss ('*Punktbockel*') decoration between the ribs on the nave-neck sheathing, a feature not seen on any other Erkenbrechtsweiler naves.

The surviving nave fittings from Großengstingen (Fig. 61, 61) conform almost exactly to the Erkenbrechtsweiler naves. The nave-head ring has not survived and only fragments of the nave-cap and nave-neck sheathing remain, but the remnants document the same ribbed bronze strip covering the seam of the nave-neck sheathing, the same iron nails with spherical bronze heads and a similar iron nave-cap (Pl. 33B, 1–2).

The nave fittings from Waltenhausen, 'Hairenbuch', tumulus III (Fig. 61, 144) have not survived. However, a sketch of a bronze object from this grave clearly shows a nave-head ring (Pl. 94B, 4). The ring was angular in cross-section with the corners accentuated by ribs, exactly like the examples from Erkenbrechtsweiler, Hradenín grave 28 and Nymburk.

The naves from Hradenín grave 28 (Fig. 61, 151E) have the iron nave-cap, bronze ribbed nave-head ring and conical bronze sheet nave-neck sheathing typical for the Erkenbrechtsweiler type (Pl. 110, 10–13.17). The seam of the nave-neck sheathing was probably covered by a bronze strip, and fastened by iron nails with large bronze heads. However, these have not survived. The nave-neck sheathing was again ribbed at the end closest to the nave-stock: in this case the seven ribs are narrow and grouped into three sets of two or three ribs.

The Nymburk naves (Fig. 61, 157) are in every respect like those from Hradenín grave 28 (Pl. 120, 1.5.8). Even the nave-neck ribbing seems to be exactly the same. On the Nymburk naves, however, the bronze sheet strip covering the nave-neck seam survives, and has the typical

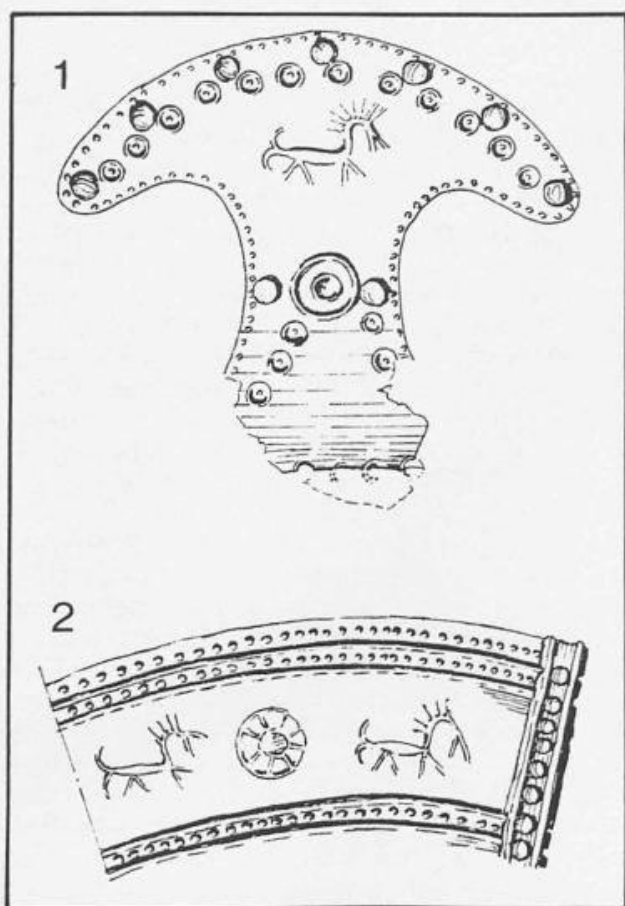


Fig. 66 Marainville-sur-Madon: 1 felloe-clamp, 2 detail of the nave decoration (after Burnand 1980). – Bronze. – Scale 3:5.

form known from Erkenbrechtsweiler, Großengstingen and Sulz am Neckar.

Another example of the Erkenbrechtsweiler nave has recently been found in a grave near Marainville-sur-Madon, in the Vosges area of eastern France. These naves are remarkable in having stamped decoration on the nave-neck sheathing at the end closest to the nave-stock (Fig. 66, 2). The stamps are of two kinds, wheel-shaped and horse-shaped. Both types of stamped decoration are known from the Hallstatt cemetery – the wheel-shaped stamp, for example, on a bronze vessel-stand from grave 507 (Kromer 1959, pl. 101, 3) and seen again in the Este area on a situla lid from Ricovero grave 233 (Frey 1969, pl. 19, 37). The iron nave-cap has inlaid triangular bronze elements which formed a zig-zag effect. The nave therefore has unfamiliar decoration, suggesting a craftsman with experience of East Alpine ornamentation.

The naves from Uffing tumulus 6 (Fig. 61, 141B) display a mixture of elements from the Erkenbrechtsweiler and Winterlingen types. While the iron nave-cap and the nave-head ring conform to the Erkenbrechtsweiler type, the nave-neck sheathing is different and the nave is also provided with nave-stock rings (Pl. 91). The bronze nave-neck sheathing has no decorative ribs, and its seam is fastened by a closely-spaced row of bronze nails with small domed heads; a bronze strip was not used to

cover the seam. The nave-stock ring is made from a narrow iron ring with 'D'-shaped cross-section, bearing inlaid bronze decoration. The ring sat on the end of the nave-neck sheathing, and held it to the wooden nave by means of iron nails. Two sorts of decoration are seen on the nave-stock rings, simple transverse lines (Pl. 91, 3) and more complex with crosses separated by triple transverse lines of inlaid bronze (Pl. 91, 2). Inlaid bronze decoration is otherwise not used on the naves of Erkenbrechtsweiler type.

It is not certain whether the few remains of bronze sheet from Uffing tumulus 11 come from a nave of Erkenbrechtsweiler type. A ribbed bronze sheet band with spherical-headed bronze nails could be the remains of a band to cover the seam of the nave-neck sheathing (Pl. 90B, 1–3). The curved shape of the band could have been caused by the wood of the nave warping after the burial and so bending the bronze fittings. Another fragment of bronze sheet decorated with ribs could come from the nave-neck sheathing (Naue 1887a, pl. 38, 7). It is doubtful whether these fragments of bronze sheet came from naves; however if they did the naves must have belonged to the Erkenbrechtsweiler type.

The Erkenbrechtsweiler type has an interesting distribution, with a concentration on the Swabian Alb and outliers in Lorraine and Central Bohemia (Fig. 68).

5.9 THE NAVE FROM EMERKINGEN

On the Emerkingen wagon, the nave-head rings were made of bronze sheet and had a simple angular cross-section (Fig. 61, 60; Pl. 33A, 2). The nave-neck again has a conical shape, with the outer end curving up steeply to fit under the nave-head ring. At the end nearest the nave-stock, the nave-neck sheathing bore ribbed decoration. The nave-neck was covered by a single piece of bronze sheet which was overlapped and held fast by a narrow nailed strip of cast bronze. The nave-caps have not survived from Emerkingen but iron caps like those on the Erkenbrechtsweiler naves seem most probable. The wagon-grave from Königen contained similar nave-head rings, but because other nave fittings are lacking, its original appearance is uncertain.

5.10 TYPE WINTERLINGEN

The only naves of this type which can be fully reconstructed are those from Winterlingen tumulus III (Fig. 62, 97). Each side of the nave had iron nave-head fittings, a bronze nave-neck sheathing and an iron nave-stock ring (Pls 53, 3; 54). The nave-cap was a simple disc, with the outer edge bent back to form a right-angle in cross-section. On one nave-cap, a small fragment with two lines of inlaid bronze decoration is still visible (Pl. 54, 2). The rest of the nave-head was fitted with an iron cover with a more complex cross-section. The outer end fitted under the edge of the nave-cap; it then formed a narrow waisted section before rising steeply to the broad nave-

head ring. Both the outer surface of the nave-head ring, as well as its front face, were decorated with inlaid bronze dot-and-circle motifs (Pl. 54, 1). On the outer face of the nave-head, the dot-and-circle motifs were interspersed with single dots of inlaid bronze. The nave-neck was slightly conical and was covered with a single piece of bronze sheet fastened by a row of small bronze nails with domed heads. The end of the nave-neck sheathing closest to the nave-stock was held to the wooden nave by an iron nave-stock ring. The nave-stock rings bore transverse lines of inlaid bronze. Two types of nave-stock ring were used on the naves from Winterlingen: narrow with 'D'-shaped cross-section (Pl. 54, 3) and broader with a 'C'-shaped cross-section (Pl. 54, 4). The Winterlingen naves bore very rich inlaid bronze decoration, which could be appreciated from the side or from above (Pl. 54, 1).

The author was only able to study a few iron nave fragments from the wagon of Kappel tumulus 3 (Fig. 62, 74B), because conservation had not yet been completed on most of the wagon parts. However, the fragments clearly came from a Winterlingen type nave (Pl. 42, 1-4). The same simple flat nave-caps are represented, with the outer edges bearing inlaid bronze decoration: either a single inlaid line (Pl. 42, 1) or a row of inlaid bronze crosses (Pl. 42, 2-3). The nave-head fittings are not fully preserved – only the section leading from the nave-cap and reaching up the frontal face of the nave-head could be drawn (most fully preserved on Pl. 42, 1). It is therefore impossible to be certain if the nave-head also bore inlaid bronze decoration, although this is very probable. The author could not find any remnants of the bronze nave-neck sheathing, but a fragment of the iron nave-stock ring with 'D'-shaped cross-section and diagonal lines of inlaid bronze was recognisable (Pl. 42, 4). Although it is obviously necessary to await the full restoration and publication of the new wagon from Kappel, there is little doubt that the nave is of Winterlingen type.

The wagon-grave from Wijchen has cast bronze axle-caps which are very similar to the iron examples from Kappel tumulus 3 (compare Pls 4 and 42, 5-6). On the rear side of one of the axle-caps' flanges (Pl. 4, 4) there is a piece of iron sheet adhering to the flange by corrosion. The iron sheet presumably came from a large flat nave-cap, and it is tempting to suggest that it was, like Kappel, of Winterlingen type. The nave could equally have been of Vilsingen type, considering that similar axle-caps come from the Vilsingen grave and the Vilsingen nave type also has large flat iron nave-caps. Other types also have nave-heads which could have left the iron fragment on the Wijchen axle-cap: types Repperndorf and Cannstatt, the naves from Hohmichele grave VI and Uttendorf tumulus 2, and the naves with simple iron nave-caps. The exact type of nave used on the Wijchen wagon will therefore never be known. However, the iron fragment on the axle-cap indicates a flat iron nave-cap about 100 mm in diameter, which rules out the naves discussed above in sections 1-9.

Among the finds from Bad Urach (Fig. 62, 53A) are two fragments of bronze nave-neck sheathing and some fragments of iron nave-stock rings which probably

belonged to naves of Winterlingen type (Pl. 31B, 1-2.5). The nave-stock rings have the broad 'C'-shaped cross-section seen on some of the rings of the Winterlingen wagon and bear three rows of diagonal inlaid bronze lines arranged in a herring-bone pattern. The closely-spaced bronze nails on the seam of the nave-neck sheathing also recall the Winterlingen nave. Sadly, the lack of nave-head fittings makes it impossible to be sure of the exact typological classification of these fragments, although it is very likely that they belong to the Winterlingen type.

The nave from Uffing tumulus 1 (Fig. 62, 141A) is also somewhat problematical because it is not well preserved (Pl. 90A, 1). The nave-head fittings are severely corroded, and compared to those from Winterlingen and Kappel they seem crudely made. Nevertheless, they involve a similar type of construction. The profile of the nave-head is again divided into a large nave-head ring, a narrower section, and a simple nave-cap. It is not certain whether the nave-head fittings bore inlaid bronze decoration, because they have never been properly restored. The nave-stock ring was broad and had a 'C'-shaped cross-section. The inlaid bronze decoration is very elaborate, composed of two rows of dots-and-semicircles separated by a row of transverse lines. According to the excavator the nave-neck was not covered with bronze sheet but was merely decorated with small iron nails with domed heads bearing inlaid bronze motifs (Pl. 90A, 2). It is difficult to judge whether the excavator was correct, but it would be highly untypical for a conical nave to have a plain wooden nave-neck.

The last nave to be considered in connection with the Winterlingen type is from Mauenheim, tumulus N, grave 3 (Fig. 62, 70B). It must immediately be said that the nave-head fittings were very poorly preserved, and the suggested reconstruction is open to doubt (Pl. 40A, 1). However, like the naves of Winterlingen type the nave-head is made in two parts, the nave-head ring having a complex profile curving down towards the nave-cap. Only a small fragment of the bronze nave-neck sheathing survives (Pl. 40A, 5) and the details of its original appearance are unknown. However, the nave-stock ring is well preserved, with a 'C'-shaped profile and transverse lines of inlaid bronze similar to the rings from Winterlingen. It seems clear that the Mauenheim nave is related to the Winterlingen type, although the nave-head fittings suggest that it is, to some extent, a variant of the type.

The naves of type Winterlingen have been found both on the Upper Rhine and the Upper Danube, with related naves known from Uffing in Bavaria (Fig. 68).

5.11 TYPE VILSINGEN

The naves from Vilsingen serve as a model for the reconstruction of the fragmentary remains from Hügelsheim and Ebingen. Together, the naves from these three wagons make up the Vilsingen type.

The naves from Vilsingen (Fig. 62, 72) can be fully reconstructed (Pl. 41A, 3). The nave-head was made from three components. The end of the nave had a simple flat

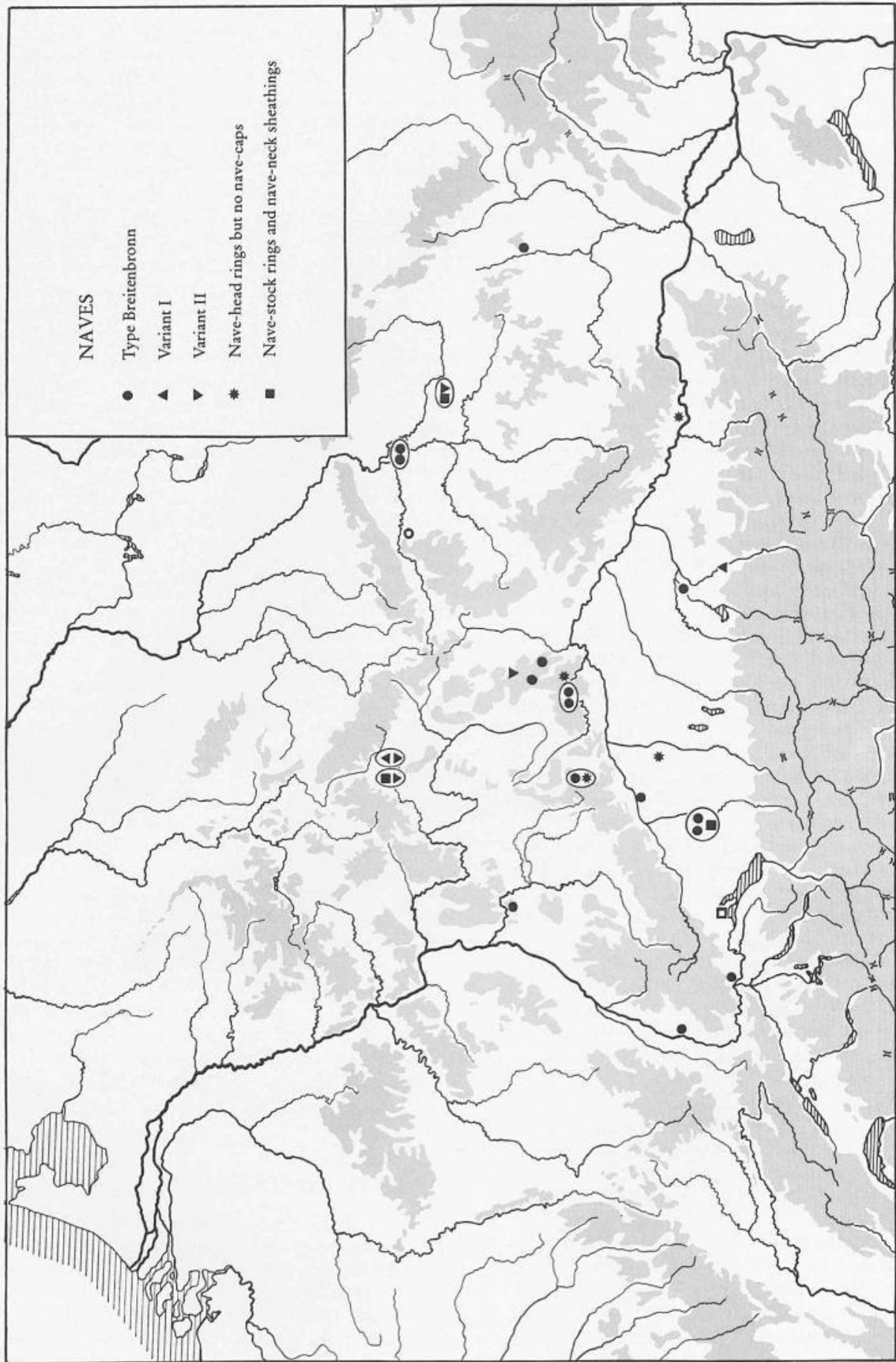


Fig. 67 The distribution of the naves of type Breitenbronn and related types.

iron nave-cap which was followed by a narrower section (between the nave-cap and nave-head ring) sheathed with bronze sheet. The ends of this bronze sheathing were fitted under the edges of the nave-cap and nave-head ring. The nave-head ring was again of iron, with a simple angular cross-section, decorated with two lines of inlaid bronze bordering a row of inlaid bronze dots-and-circles. Curving from the nave-head ring was the conical bronze sheet nave-neck sheathing which was held together by a row of bronze nails with large round flat heads. The nave-neck sheathing was also held fast by an iron nave-stock ring which again bore inlaid bronze dot-and-circle decoration.

Only a few fragments have survived from the naves from Hügelsheim (Fig. 62, 68), which have been ingeniously reconstructed by S. Schiek (Pl. 38, 2-3): fragments of the bronze sheathing of the nave-head, the iron nave-head ring (decorated with inlaid bronze dots-and-circles) and the iron nave-stock ring (Pl. 38, 3 – decorated with inlaid bronze dots-and-circles and an outer fringe of inlaid bronze transverse lines).

Even less is left from the naves from Ebingen tumulus I of 1932 (Fig. 62, 48). Only the nave-head ring and nave-stock ring are represented among the fragmentary remains of the wagon (Pl. 27A, 5-7). Nevertheless, the nave-head ring bears the typical inlaid bronze dots-and-circles bordered by inlaid bronze lines; and the cross-section of the iron nave-stock ring shows a step on its underside, presumably from where the iron ring overlay the bronze nave-neck sheathing. Among the finds from this grave which have been lost were some fragments of bronze sheet fastened together by bronze nails with large flat heads. A sketch of one of these fragments survives (Pl. 27A, 13), and it seems very likely that they came from the seam of the nave-neck sheathing (compare with Vilsingen, Pl. 41A, 3).

Another wagon-grave may have contained naves of Vilsingen type. From Eggingen comes a well-preserved bronze nave-neck sheathing with a pair of ribs and a seam fastened by a row of bronze nails with large flat round heads (Pl. 51D, 2). The characteristic round flat nail heads find parallels on the naves from Vilsingen and Ebingen. Furthermore, the slight flange on the nave-neck sheathing at the end by the nave-stock obviously accommodated a nave-stock ring which was no doubt applied to the nave-stock in a vertical plane, as on the naves from Vilsingen and Hügelsheim. Of course it is impossible to be sure of the nave-head fittings which were used on the Ulm-Eggingen naves, making their typological classification rather difficult.

The overall appearance of the Vilsingen type of naves is quite similar to that of the Winterlingen naves. They have the same tripartite nave-head and both types have a bronze nave-neck sheathing fitted with an iron nave-stock ring. Bronze inlaid decoration is also characteristic of both types, and dot-and-circle motifs are used on both Winterlingen and Vilsingen naves.

The Vilsingen type is concentrated on the Swabian Alb, with one example known from the Upper Rhine (Fig. 68).

5.12 OTHER CONICAL NAVES

In five graves remnants of naves have been found which, although certainly of the conical category, are too incomplete to allow a close typological classification.

In the case of Salem tumulus G only a fragment of an iron nave-stock ring survives, which is 'D'-shaped in cross-section (Pl. 47A, 1). Although the grave apparently also contained fragments of bronze sheet, they have not survived and it is not known whether they came from the nave-necks. Narrow nave-stock rings with 'D'-shaped cross-section are not confined to a single nave type, being represented on the wagons from Uffing tumulus 6, Winterlingen, Kappel and Ebingen.

In Sesto-Calende grave B of 1928 only the bronze sheet nave-neck sheathing has survived from the naves (Pl. 136, 2). It is conical in shape and bears three ribs, and has a seam joined by a row of bronze nails with large flat round heads. Sadly the nave-neck sheathing is not characteristic enough to be able to assign it to any of the four conical types described above, although both the nailing and the three ribs find parallels on wagons north of the Alps.

Smaller fragments of bronze sheet nave-neck sheathing were found in the graves from Švihov – Červené Poříčí and Birmenstorf. The fragments from both graves are ribbed: the Švihov fragment bears three ribs (Pl. 126B, 1) and that from Birmenstorf has two surviving ribs (Pl. 24B, 9), probably from an original set of three decorative ribs. The Birmenstorf grave contained another bronze sheet fragment which fitted either to a spoke or to the nave-neck (Pl. 24B, 8). If it came from the nave-neck it would indicate that the whole nave-neck was covered with bronze sheet – if not, the nave-neck may only have been partially covered with bronze sheet, as in type Ins. Owing to the incomplete survival of the Švihov and Birmenstorf naves it can only be suggested that the naves could have been of conical type.

A very small fragment of bronze sheet is the only possible surviving nave-fitting from the wagon-grave from Sigmaringen. However, on the patina of the bronze sheet it is possible to detect traces of an overlapped join and a nail hole, suggesting that the fragment could come from a bronze nave-neck sheathing (Pl. 50B, 2). Although the naves from Sigmaringen were therefore probably of conical type, it is of course impossible to relate the fragment to a specific type.

These nave fragments have been found in south-west Germany and Switzerland, corresponding to the distribution of the other types of conical naves (Fig. 68). The fragment from Švihov-Červené Poříčí, in south-west Bohemia, has an isolated position and may not belong to this kind of nave.

5.13 THE NAVES FROM HOHMICHELE GRAVE VI AND UTTENDORF TUMULUS 2

The naves from Hohmichele, grave VI (Fig. 63, 51B) are very well preserved and can be fully reconstructed (Pls 28A; 29). The nave-head was made from a broad iron

nave-head ring and a disc-like iron cap. The nave-head ring was 60–64 mm wide and, in most cases, completely undecorated; one nave-head was exceptional, bearing 11 engraved lines in four groups (Pl. 29). The nave-neck was slightly conical in shape and sheathed with bronze sheet. The bronze sheet on the nave-neck was overlapped and the join was covered, as on the Emerkingen nave, by a strip of bronze sheet and held in place by four bronze nails. The end of the nave-neck fitted under the iron nave-stock ring, which was 'L'-shaped in cross-section. The nave-stock ring bore rich inlaid bronze decoration: transverse lines on its outer surface and a combination of cross-hatching and radial lines on its frontal surface.

It is not certain to what extent the naves from Uttendorf tumulus 2 are related to the Hohmichele examples. There remain only a broad iron nave-head ring and a small fragment of the disc-like iron nave-cap (Pl. 128, 2). The nave-head ring has the same short cylindrical form as on the Hohmichele naves, now 50 mm wide instead of the 60–64 mm of the Hohmichele examples. The Uttendorf nave-head ring differs, however, in its rich inlaid bronze decoration composed of alternating rows of transverse lines and dots-and-circles. It also seems significant that the Uttendorf nave-head fittings were joined together with bronze solder, whereas the Hohmichele nave-head ring and nave-cap were probably fastened to the wooden nave by nails.

It is impossible to judge exactly how similar the Hohmichele and Uttendorf naves were originally, because only the nave-head of the latter nave can be reconstructed.

5.14 TYPE REPPERNDORF

The naves from Repperndorf (Fig. 63, 123) use iron components similar to those from Hohmichele grave VI. The nave-heads were fitted with a broad cylindrical ring, ca. 56 mm wide, which was mounted over the simple iron nave-cap (Pl. 80, 1–2). The nave-neck was not sheathed with metal, but between the nave-neck and nave-stock was an iron collar with an angular cross-section (Pl. 80, 3–4). Unlike the Hohmichele nave, naves of Repperndorf type never bear inlaid bronze decoration.

Praha-Bubeneč grave 3 (Fig. 63, 164) contained similar iron nave fittings (Pl. 123, 1–5). On one nave-cap (Pl. 123, 4) remains of the broad cylindrical nave-head ring are preserved, but the complete original width of the nave-head ring is not known. The nave-stock ring has the same angular profile already seen from Repperndorf (Pl. 123, 5). The nave fittings from Simmringen (Fig. 63, 69) are less well preserved. Only a small fragment of the nave-cap has survived (Pl. 39A, 2), along with a few fragments of the broad cylindrical nave-head ring, which was 60 mm wide (Pl. 39A, 1). It is uncertain whether the nave was originally provided with a nave-stock ring: considering the incomplete nature of the nave-head fittings the absence of remains from the nave-stock ring is inconclusive. As in the case of Simmringen, the grave from Oberleinach only contained fragments from the nave-cap

(Pl. 78, 5–6) and nave-head ring (Pl. 78, 11). Several further fragments of iron sheet from the grave may suggest that the nave-head ring measured about 50 mm in width.

The nave fittings from Görau tumulus 3 (Fig. 63, 147B) are somewhat different, here including remains of the nave-caps (Pl. 98, 1–2) and a nave-neck sheathing (Pl. 98, 3). By analogy with Repperndorf and Praha-Bubeneč, a broad cylindrical iron nave-head ring was probably mounted over the nave-cap and probably fitted over the flange of the nave-neck sheathing. The nave-neck sheathing was slightly conical and had a broad raised rib in the middle. The fact that both ends had a flange suggests the existence of a nave-stock ring and nave-head ring, no doubt resulting in a nave shaped like those from Repperndorf.

It is rather difficult to interpret the nave fittings from Schwalbach tumulus 1. Fragments from at least five iron nave rings have survived and if, as the excavators claim, the vehicle from this grave was really two-wheeled then some of the rings must be from the nave-stock (Anon. 1961, 166, fig. 5, 1–5). Indeed, although the drawings of the rings may not be completely reliable, some have a larger diameter than others and seem most likely to be comparable to the nave-stock rings from Repperndorf and Praha-Bubeneč (ibid. 1961, 166, fig. 5, 3). Other rings can clearly be recognised as nave-caps (ibid. 1961, 166, fig. 5, 1.4.5). If this is correct, then the naves must belong to the Repperndorf type but owing to the somewhat unsatisfactory publication of the Schwalbach nave fittings caution is necessary.

The naves of the following two wagons, from Mauenheim and Rumpenheim, cannot be included in the Repperndorf type although they seem to be related. Only a few fragments survive from the naves of Mauenheim, tumulus M, grave 3 (Fig. 63, 70A), but a simple discoidal iron nave-cap and a short cylindrical nave-head ring, 43 mm wide, can be recognised (Pl. 39B, 3). The nave-neck is sheathed in a cylinder of iron sheet, the outer end of which was bent out to meet the flange of the nave-head ring. The nave-neck sheathing has not survived to its complete length and the original length of the nave-neck is therefore unknown. A single iron fragment probably comes from a nave-stock ring, which was curved in cross-section. The nave is disqualified from membership of the Repperndorf type by the nave-head ring which is too narrow, the nave-neck sheathing which has no exact parallels and the singular curved cross-section of the nave-stock ring.

In contrast to the Mauenheim example the naves from Rumpenheim (Fig. 63, 45) are very well preserved. Furthermore, they have been well published by Froberg (1974). Like the naves of Repperndorf type the nave-cap is simple and was covered by a broad cylindrical iron nave-head ring. However in this case the nave-head, with a length of 100 mm, was much longer than on the Repperndorf type. The nave-neck sheathing was slightly conical and the ends were flanged to meet both the nave-head ring and nave-stock ring. The nave-stock ring had an 'omega'-shaped cross-section and was not decorated.

The Repperndorf type has an interesting distribution,

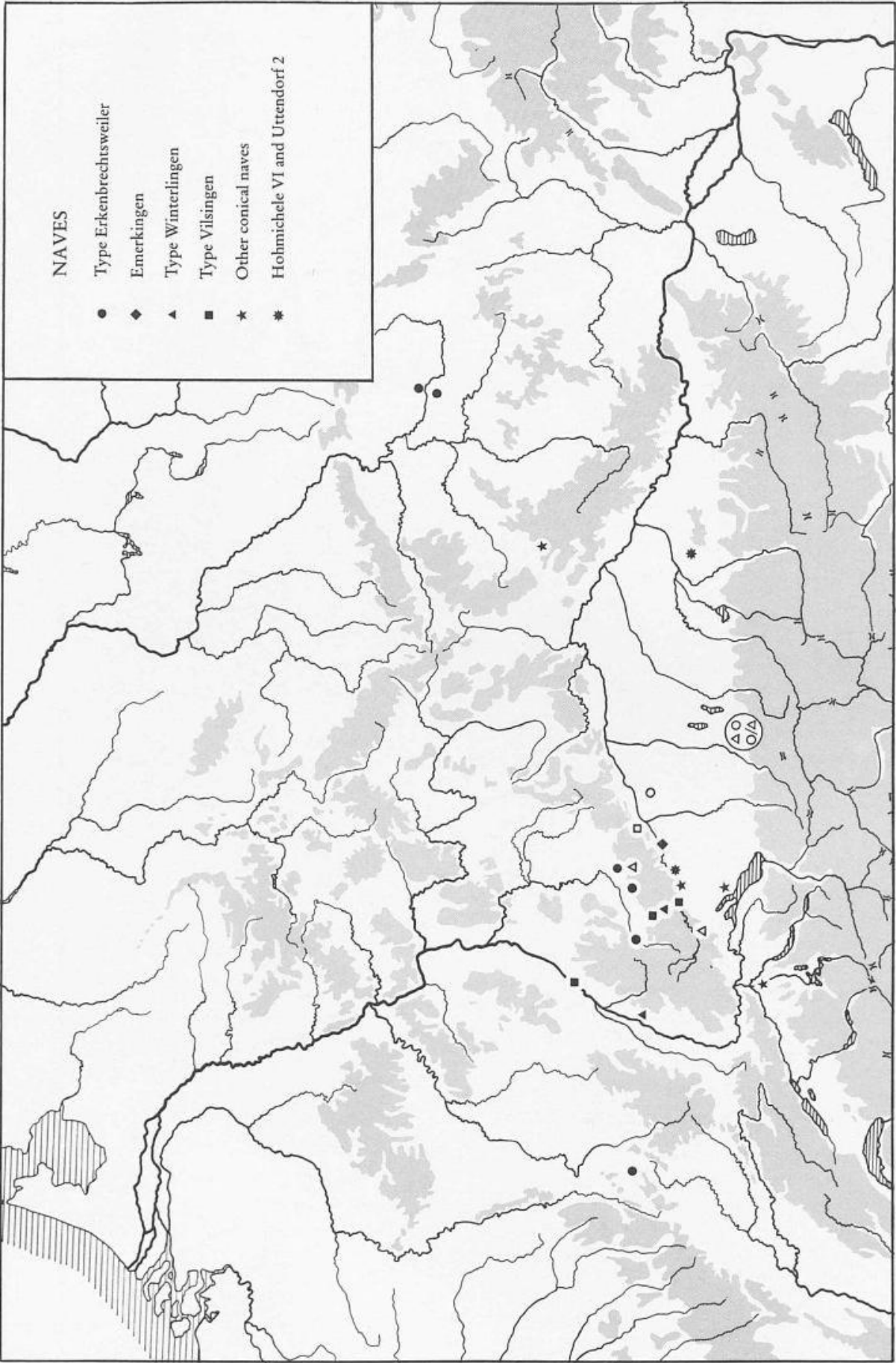


Fig. 68 The distribution of conical naves.

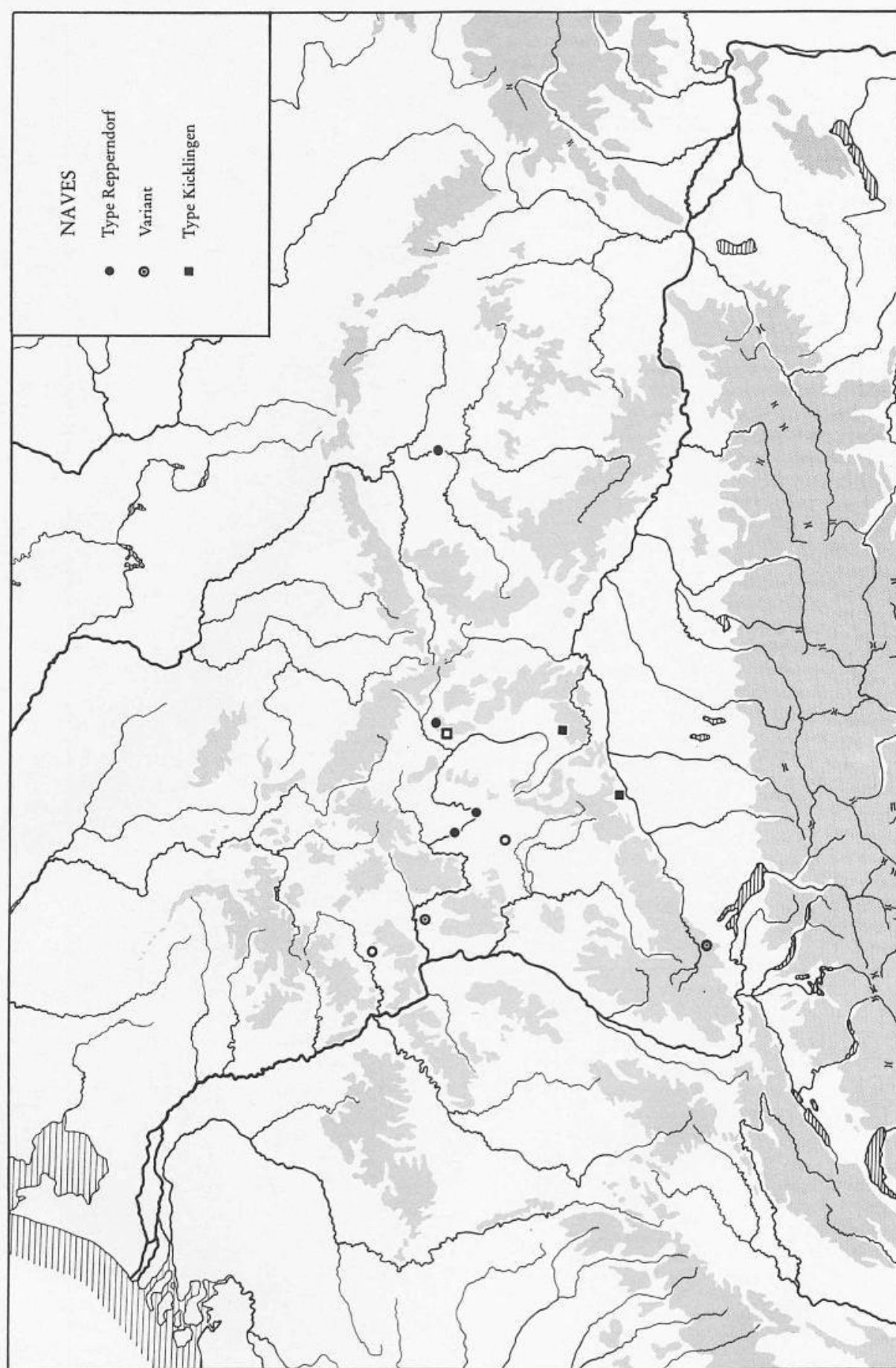


Fig. 69 The distribution of the naves of types Repperndorf and Kücklingen.

with examples concentrated on the Main, indicating a local workshop tradition (Fig. 69).

5.15-16 TYPE GRANDVILLARS AND NAVES WITH SIMPLE IRON NAVE-CAPS

It is not certain to what extent the Grandvillars naves constitute a distinct type. The type is characterised by simple naves with disc-like iron nave-caps and a narrow band of iron sheet for the nave-head ring. Five wagons have this type of nave: Grandvillars (nave-head ring 36 mm wide, Pl. 9B, 6), Saraz (37 mm wide, Pls 19; 20A, 1-3.5), Hermrigen (30 mm wide, Drack 1958a, 24, fig. 22, 1.3), Bell (48 mm wide, Rest 1948, 138, fig. 3) and Weilerbach (47 mm wide, Engels 1969, pl. 2, 3). Apparently the grave from Savoyeux contained two disc-shaped nave-caps and some undecorated iron sheet, which could represent another member of the type. The fragmentary remains from Plattenhardt (Pl. 35B, 1.5) and also the fittings from Stuttgart-Weilimdorf, which have not survived, are further possible candidates for the Grandvillars type.

Another series of naves have the same kind of simple nave-cap but no nave-head ring; they may be related to the Grandvillars type. One grave comes from France (Ivory, Pl. 10C, 2), six from Switzerland (Grächwil: Jahn 1852, pl. 2, 5; Châtonnaye: Drack 1958a, 25, fig. 23, 2; Ins, tumulus VI of 1848, upper grave: *ibid.* 1958b, pl. 7, 41-44.115; perhaps Ins, tumulus of 1849: *ibid.* 1958b, pl. 4, 18; Rances: *ibid.* 1958a, fig. 23, 1; Urtenen: *ibid.* 1958a, fig. 23, 4), and possibly two from Germany (Lendsiedel and Oberlahnstein).

Although these nave fittings are too simple to allow typological precision the distribution of the Grandvillars type and the naves with simple nave-caps suggests that they may constitute a discrete group. Thus the naves are confined to the Middle Rhine area, West Switzerland, and the Doubs and Saône valleys of East France, with only three possible exceptions from North Württemberg (Fig. 70).

5.17 TYPE KICKLINGEN

Fortunately, the wagon remains from Kicklingen (Fig. 63, 109) were well excavated and the original shape of the naves can be reconstructed. The naves had a simple iron nave-cap and a conical nave-neck bound with four narrow iron bands (Pl. 68A, 1). At the base of the conical nave-neck was an iron nave-stock ring which was slightly angled in cross-section. The Kicklingen naves serve as a model for the reconstruction of the nave-cap, nave-neck bands and nave-stock rings from Weinsfeld, 'Lohe', tumulus 4, grave 5 (Fig. 63, 118; Pl. 76, 1-11). The fittings are so similar to those from Kicklingen that the same conical nave shape is very likely. Fewer fittings survived from the wagon from Demmelsdorf (Pl. 88A, 2-5). Although the naves do not seem to have been provided with nave-stock rings, they have nave-caps

similar to those from Kicklingen and Weinsfeld, as well as narrow iron bands. The author was able to count 24 fragments of iron bands, and the Kicklingen type seems to be the only construction on which they could have been used.

The rather close distribution of these naves could suggest the activity of a local workshop group (Fig. 69). However with only two certain and one uncertain find, caution is required in the interpretation of the naves.

5.18 TYPE CANNSTATT

With their richly decorated metal fittings and characteristic cylindrical shape these naves form a distinctive group. However, six naves of the Cannstatt type are rather untypical, and will be discussed first.

The naves from Augsburg-Wellenburg (Fig. 63, 103) are covered with simple undecorated iron sheet and have slightly conical nave-necks (Pl. 59, 1-5). Both these features recall the Repperndorf type, the naves from Rumpenheim being particularly similar. Nevertheless, the detailed construction of the Wellenburg nave, for example the stepped profile of the iron sheet between the nave-neck and nave-stock, owes more to the Cannstatt than the Repperndorf type.

The only other undecorated nave of Cannstatt type comes from the Býčí-skála cave (Fig. 63, 148/iii). These fittings were severely damaged in a museum accident and their exact original appearance is open to question. Between the nave-stock and neck the bronze sheet has a stepped profile, typical for the Cannstatt naves (Pl. 105, 1). The nave-neck is cylindrical and has a flange at both ends. Little survives from the nave-head, but it was probably cylindrical in shape and undecorated.

Four naves had applied iron bands instead of the ribbing typical for Cannstatt naves: Kappel tumulus 1 (Fig. 63, 74A), Langenhart, 'Haggenberg' (Fig. 63, 79), Hochdorf (Biel 1985a, 92, fig. 104; 156-7, fig. 180), Quinçay (Fig. 71a). In the case of Kappel (Pl. 41C, 1-3) and Quinçay (Fig. 71a) the naves were richly decorated in inlaid bronze with ladder and dot-and-circle motifs. The decoration of the Hochdorf naves may have looked similar, although here inlaid bronze was not used to emphasise the ornamentation. The nave fragments from Langenhart have not been restored and it is uncertain whether they were decorated (Pl. 43B, 1). The naves of these four wagons, with their band decoration, form a variant of the Cannstatt type.

In all, including Quinçay, there are 24 wagons with naves of Cannstatt type (Niederrieden, discussed below, may represent a twenty-fifth). The majority are made of iron, with only three made of bronze: Býčí-skála cave, wheel types i and iii and Ludwigsburg. Apart from the six atypical cases described above, the Cannstatt naves were all decorated with ribs and seem to be fairly uniform in shape. One feature which all the naves seem to have held in common is the stepped profile of the sides of the nave-stock. The ribbed decoration of the naves is very varied with rounded, triangular and profiled ribs all being

represented. On seven of the naves the nave-stock had sockets for the spokes. These could either be short cylindrical tubes or rectangular openings. The naves from Sainte-Colombe, 'La Garenne', had slightly conical tube-like sockets, the bases of which had rectangular openings for the spokes' tenon sockets (Pl. 18, 1.4–5). The Cannstatt naves are listed below:

- 1) Apremont, grave 1 (Fig. 64, 2A; Pl. 6B, 6).
- 2) Apremont, grave 2 (Fig. 64, 2B; Pl. 7, 1).
- 3) 'Burgundy' (Fig. 64, 4; Pl. 10A).
- 4) Sainte-Colombe, 'La Butte' (Joffroy 1958, 79, fig. 16, 8).
- 5) Sainte-Colombe, 'La Garenne' (Fig. 64, 13B; Pl. 18, 1–5).
- 6) Veuxhautes-sur-Aube (Fig. 64, 16; Pl. 15B, 2–3).
- 7) Allenlütten (Fig. 64, 19; Pl. 24A).
- 8) Niederweiler (Driehaus 1966b, 39, fig. 4, 6).
- 9) Asperg, 'Grafenbühl' (Fig. 64, 52; Pl. 30, 6–12).
- 10) Bad Urach, cat. no. 53B (Fig. 64, 53; Pl. 31B, 3–4).
- 11) Eberdingen-Hochdorf (Fig. 93; Biel 1985a, 92, fig. 104; 156–7, fig. 180; 1985b, pls 42–3).
- 12) Kappel-Grafenhausen, tumulus 1 (Fig. 63, 74A; Pl. 41C, 1–3).
- 13) Ludwigsburg, 'Römerhügel', chamber grave 1 (Fig. 64, 78; Pl. 45, 4–5.9–11).
- 14) Meßkirch-Langenhart, 'Haggenberg' (Fig. 63, 79; Pl. 43B, 1).
- 15) Stuttgart – Bad Cannstatt, grave 1 (Fig. 64, 90; Pl. 48, 1).
- 16) Augsburg-Wellenburg (Fig. 63, 103; Pl. 59, 1–5).
- 17) Donauwörth, 'Riegelholz', tumulus 10 (Fig. 64, 111; Pl. 70B, 2–3.5–6).
- 18) Starnberg-Mühlthal, tumulus 1 of 1885 (Fig. 64, 139; Pl. 89B, 1).
- 19) Býčí-skála cave, wheel type i (Fig. 64, 148/i; Pl. 100).
- 20) Býčí-skála cave, wheel type ii (Fig. 64, 148/ii; Pl. 102).
- 21) Býčí-skála cave, wheel type iii (Fig. 63, 148/iii; Pl. 105, 1).
- 22) Býčí-skála cave, wheel type iv (Fig. 64, 148/iv; Pl. 105, 7).
- 23) Helpfau-Uttendorf tumulus 5 (Fig. 64, 176B; Pls 129; 130A, 2–3.5).
- 24) Quinçay, Tombe de Sénecret, ar.Poitiers, Vienne (Fig. 71a; Pare 1989b).

The nave from Niederrieden, 'Lehbühl', could possibly be added to the list of Cannstatt naves. Only a few fittings have survived, which might be comparable with the undecorated fittings from Augsburg-Wellenburg (Pl. 86A, 1–6). One fragment however, probably from the nave-head, has a row of small decorative bosses which is uncharacteristic for the type (Pl. 86A, 4). A distant parallel could be sought in the applied bossed strips on the naves from Uttendorf tumulus 5 (Pl. 129, 1).

The nave from Hundersingen, 'Gießbübel', tumulus 1, secondary grave 1 could also possibly be included in the list above. Only a simple disc-shaped iron nave-cap survives from the nave (Pl. 35A, 1). However, the wagon also had hemispherical iron axle-caps with a broad flange, a type which has only been found on naves of Cannstatt type (Wellenburg type, see Ch. 6.2.1 and 6.2.4). The same is true for the axle-cap from Wohlen (Fig. 72, 16), which also probably belonged with a type Cannstatt nave. In the case of Hundersingen, 'Talhau', tumulus 4 and Oberstetten tumulus 2 it is the spoke fittings which make a Cannstatt nave likely. This will be explained in more detail below but it should be noted here that

Cannstatt naves are also likely on these wagons (see Ch. 6.1).

The Cannstatt naves have a wide distribution, but seem to be concentrated mainly around the north-west Alpine 'Fürstensitze' (Fig. 71). The examples from further east, in particular those from Uttendorf and the Býčí-skála cave, probably show influence from the 'Fürstensitz' area.

5.19 MISCELLANEOUS NAVES

In numerous graves the naves have survived so incompletely that they cannot be assigned to any of the types described above; in other cases the nave fittings were not kept by the excavators (cat. nos: 6; 39; 40A; 40B; 94A; 106C; 127; 133; 140; 166; 172; 177). In the case of Vix, however, the naves are well preserved but remain unique (Fig. 62, 17; Pl. 20B). Their curved shape may be related to the conical naves – for example Harburg-Marbach and Como-Ca' Morta – although the nave fittings have no exact parallels. There were three sorts of bronze sheet fittings: for the nave-stock, neck and head. The nave-head was short and cylindrical, decorated with two sets of three ribs. The nave-neck had a waisted collar of bronze sheet bearing one set of three ribs, and the nave-stock was almost spherical in shape, bounded on each side by ribs. The two nave-stock fittings had semicircular openings which met to form apertures for the 10 spokes. Each end of the nave had a simple iron nave-cap. The tripartite ribbing used on the Vix naves – one large rib with a smaller rib on either side – is paralleled on the iron naves of Cannstatt type from the Asperg 'Grafenbühl', on the naves from Como-Ca' Morta and on some of the naves of type Wehringen.

The naves from Como-Ca' Morta grave of 1928 betray links with the conical naves north of the Alps (Fig. 62; Pl. 134, 1). The conical nave-necks are sheathed with bronze sheet bearing four ribs near the nave-stock. The bronze sheet curves steeply outwards to meet the nave-head fittings. At this point the bronze sheet of the nave-neck sheathing is folded back and is covered by a cast bronze ring which has a 'C'-shaped cross-section (Pl. 134, 6). The nave-head itself is covered by a cast bronze cap. The inner end of the cap bears three ribs: a larger rib bordered by a pair of smaller ribs. The diameter of the nave-cap decreases towards the end of the nave and the cap has a rib where it forms the vertical frontal face around the axle-channel. The nave-stock itself is covered with 'I'-shaped pieces of bronze sheet which leave 10 circular apertures for the spokes.

Although the nave-stock and nave-neck fittings are similar to those north of the Alps, the cast bronze nave-head has no parallels. It is therefore impossible to compare the Ca' Morta nave with a specific Central European type, although it may be suggested that the closest parallel is, perhaps, the nave from Harburg-Marbach. Both naves have 'I'-shaped bronze sheets covering the nave-stock and the nave-heads are also somewhat similar, even though the Harburg-Marbach example is made of iron. The naves from Vix offer another

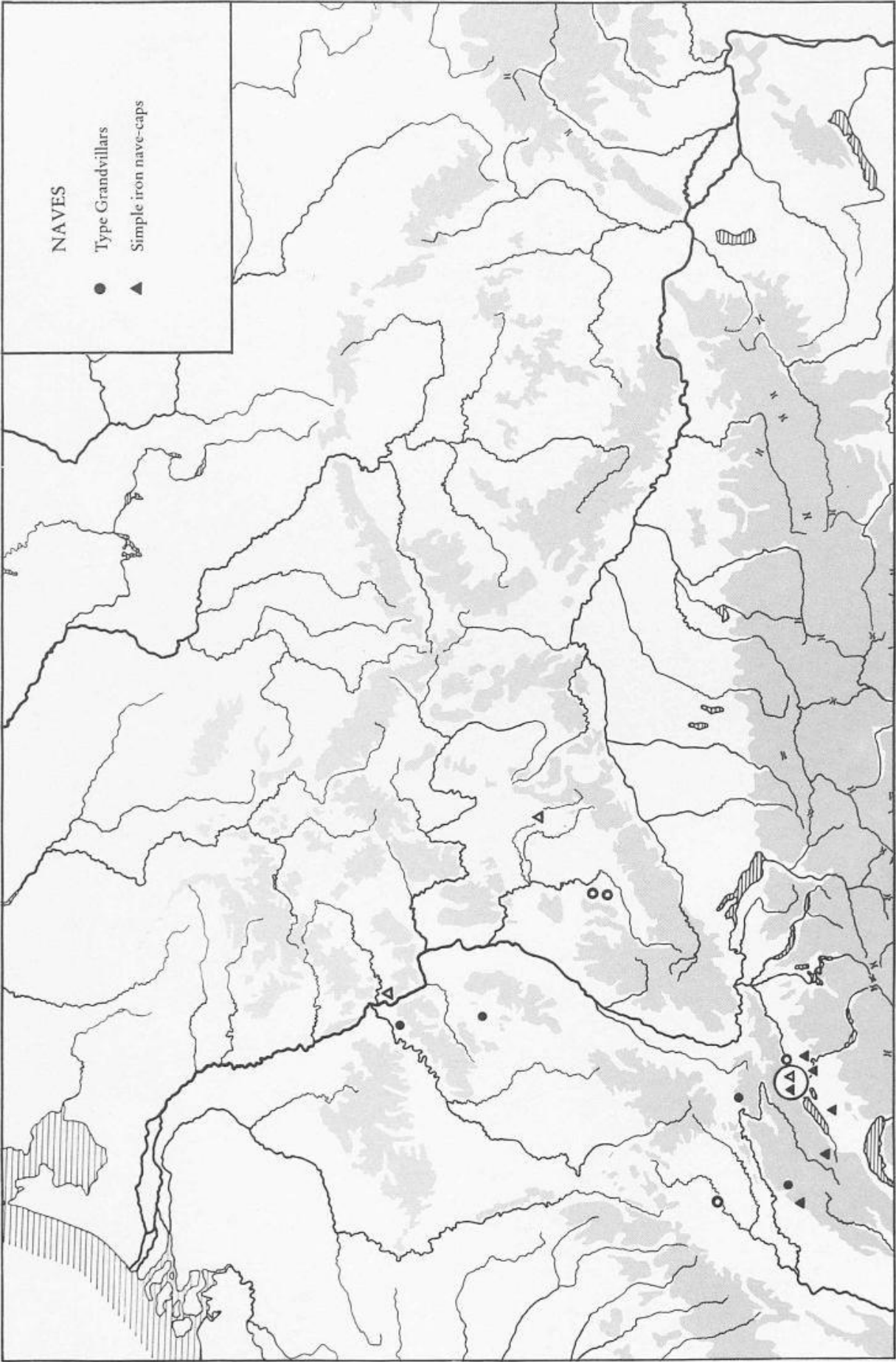


Fig. 70 The distribution of the naves of type Grandvillars and the naves with simple iron nave-caps.

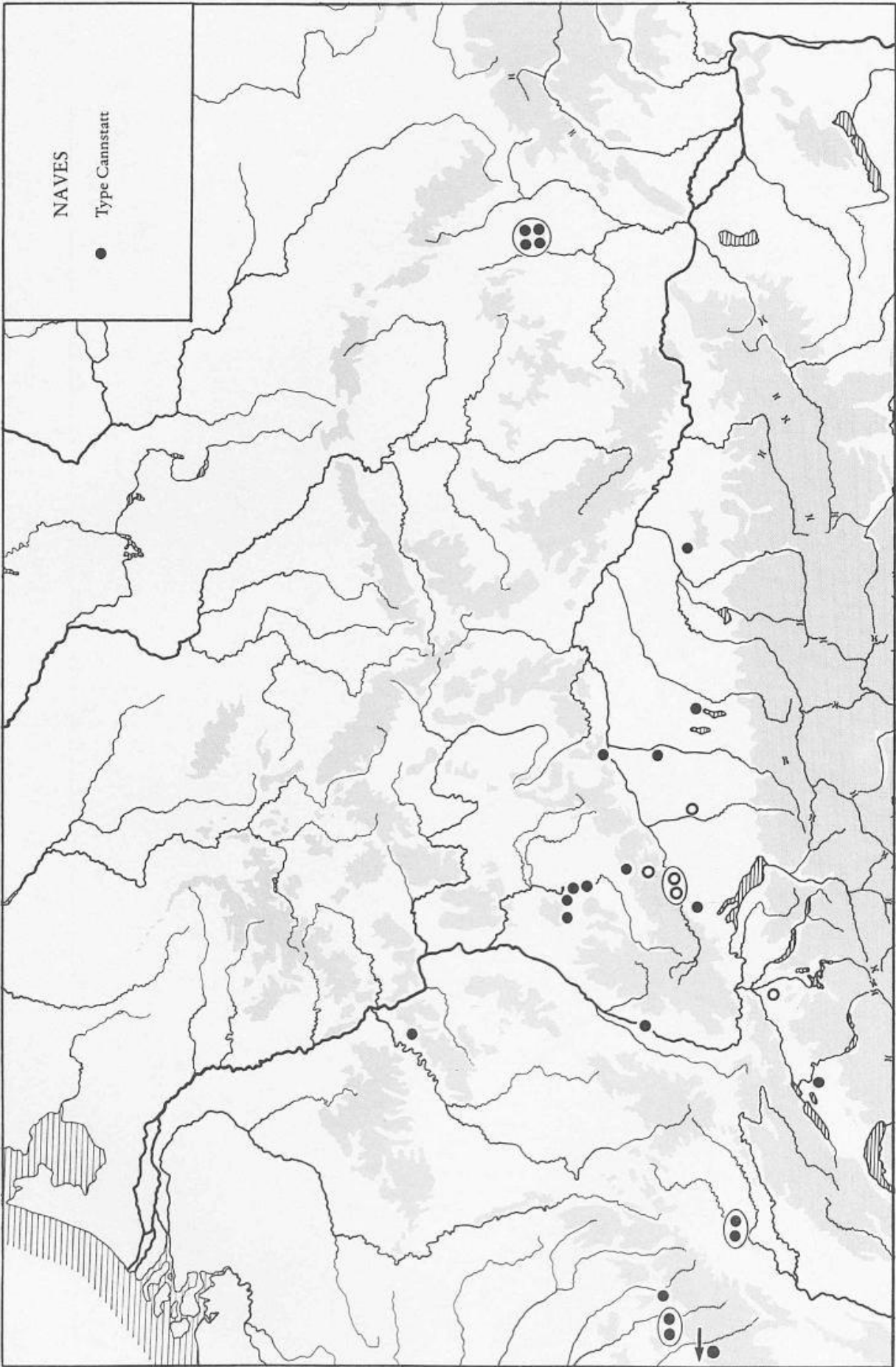


Fig. 71 The distribution of the naves of type Cannstatt.

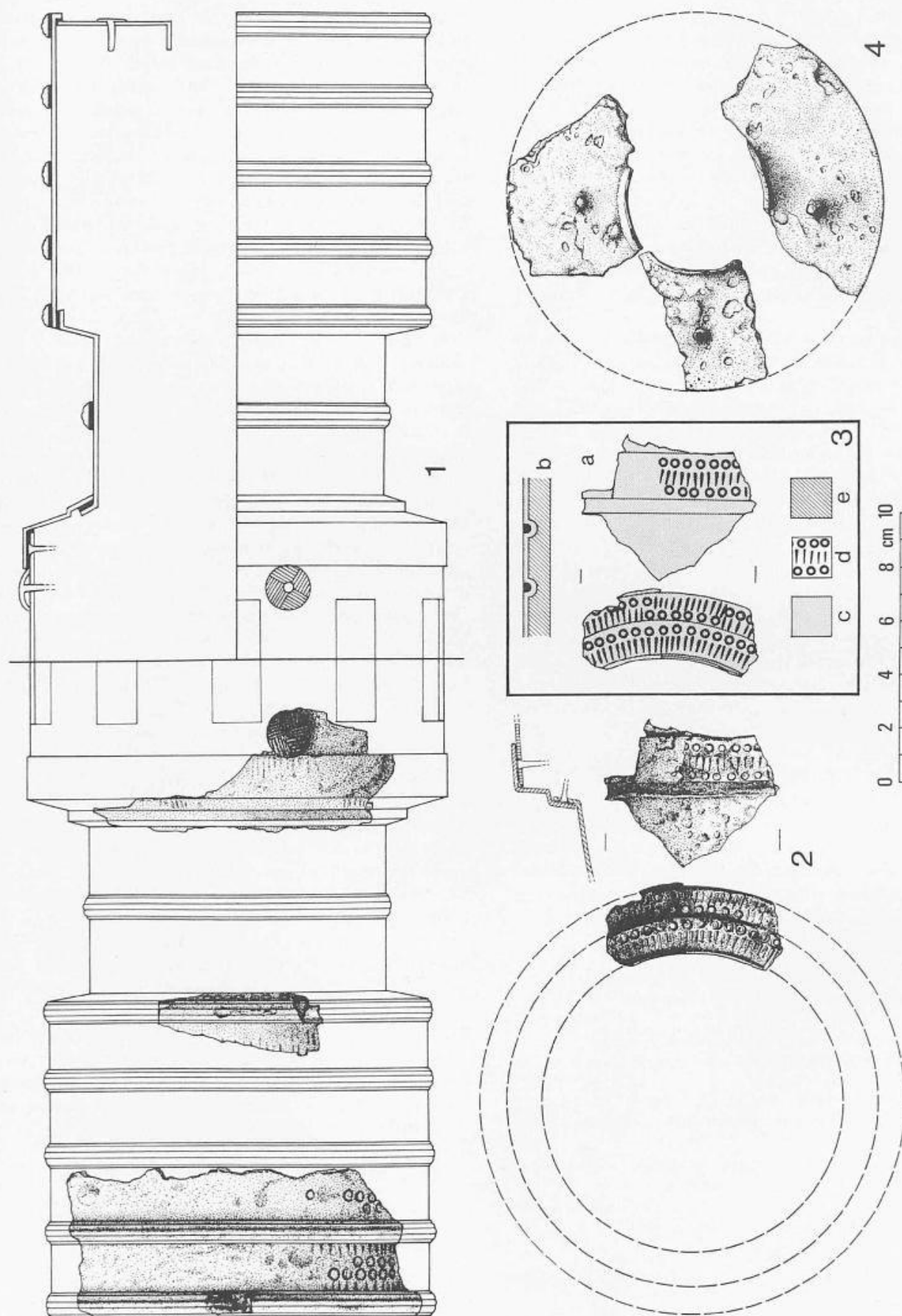


Fig. 71a Iron nave fittings with bronze decoration from the 'Tumulus de Séverel' near Quinçay (Vienne): 1 Reconstruction of a nave. - 2 Fragmentary fittings from between the nave-neck and nave-stock. - 3a Diagrammatic representation of the decoration of 2. - 3b Schematic cross-section of a decorative element. - 3c Yellowish bronze alloy. - 3d Reddish copper alloy. - 3e Iron. - 4 Three fragments of a nave-cap.

rather distant parallel: in particular the Vix naves are decorated with tripartite ribbing similar to that on the Ca' Morta nave-cap.

The nave fittings from Kladruby are less well preserved, but enough survive to indicate a nave which cannot be included in our typological classification (Pl. 115, 1–7). The naves had simple iron caps (Pl. 115, 6–7), as well as cylindrical bronze sheet sleeves decorated with pairs of ribs, presumably from the nave-head (Pl. 115, 1–2). Some bronze and iron bands were also probably used in the nave construction (Pl. 115, 3–5). The nave-head was apparently more than 50 mm long, and a cylindrical construction like the Cannstatt naves could be suggested. On the other hand the bronze and iron bands found in this grave would not be suitable for a Cannstatt type of nave.

Nothing has survived from the naves of the wagon from Hohmichele, grave I. Nevertheless, the excavators apparently found rusted remains of bronze and iron on the grave floor, the position of which would correspond to the naves (Fig. 164). If so, the naves were fitted with bronze, and had iron fittings at either end (nave-caps or nave-head rings?). It is therefore most likely that the naves belonged to one of the conical types – with bronze nave-necks – but naturally it is impossible to be more precise.

Simple iron discs have been found in three graves and may constitute a further type of nave construction: Aislingen, 'Oberes Ried' (Pl. 56A, 9–10) and Hradenín graves 5 and 18 (Pls 108B, 8; 108C, 1). The rings vary considerably in size, and could have been used as washers on the axles. The fact that in all three cases the discs were associated with linchpins may suggest that they were positioned at the end of the axle between the naves and linchpins.

A pair of discs were found in Somlóvásárhely tumulus I (Horváth 1969, 111, fig. 4, 1–2). These were made of bronze and had thickened internal rims which were decorated with engraved diagonal lines (internal diameter 40 mm, external diameter 70 mm). On one of the rings the inner rim was misshapen owing to differential wear. Very similar discs were found in Vaszar tumulus 5 (excavations of G. Rhé) and further discs have been found in six or seven other graves:

- 1) Novo mesto, 'tripod grave': Gabrovec 1968, pl. 2, 9–10.
- 2) Kaptol, tumulus II, grave I: Vejvoda and Mírník 1971, pl. 3, 1.
- 3) Nagybaráti grave I: Börzsönyi 1909, 253, fig. 18.
- 4) Nagyberki-Szalacska tumulus I: Kemenczei 1974, 9, fig. 6, 10.
- 5) 'Boba': Horváth 1969, 116, fig. 11, 1–2.
- 6) Vaszar tumulus 5, excavations of G. Rhé: Horváth 1969, 125, fig. 25, 1–3.
- 7) Vaszar tumulus 5, excavations of S. Mithay: Mithay 1980, 60, fig. 7, 15; 62, fig. 9, 2; 63, fig. 10, 4.
- 8) Csöngé tumulus I: the published illustrations are too poor to be certain about the form of these rings, Lázár 1955, pl. 32, 14.16.

The Vaszar examples argue against an interpretation of the Somlóvásárhely discs as axle fittings, because two different sizes were found (one disc with an external diameter of 95 mm and an internal diameter of 51 mm, two discs with an external diameter of 75 mm and an internal diameter of 38 mm). The engraved decoration on the discs from Vaszar tumulus 5 (Rhé) and Somlóvásárhely is also quite unsuitable if the discs were to be used as washers or nave-caps. As for the discs from the tripod grave of Novo mesto, Kaptol, tumulus II, grave I and Nagyberki-Szalacska tumulus I these are all too small for wheel fittings and should certainly be related to the belt pendants found frequently in Slovenia (e.g. Valična vas: Teržan 1973, pl. 13, 2; Javor: Guštin and Knific 1973, pl. 4, 18; Magdalenska gora: Hencken 1978, 106, fig. 33, a; 275, fig. 322, a.b.j).

Perhaps the discs from Somlóvásárhely and Vaszar tumulus 5 (Rhé) had the same function which Mithay suggested for the iron discs from his excavation of Vaszar tumulus 5. Mithay's excavations uncovered three iron discs with thickened internal rims and slight protrusions on one side (external diameters 64–70 mm, internal diameters ca. 28 mm; Mithay's illustrations of these discs are unreliable). He argued that the discs could belong to the horse-gear, and noted that their internal diameters correspond with the external diameters of the rein ornaments (Mithay 1980, 77). According to Lázár's description of the finds from Csöngé tumulus I, it seems that these discs are actually rusted to iron rein-knobs (Lázár 1955, pl. 32, 14.16). Alternatively these bronze and iron rings could have been used as rattling pendants, like the discs from Sesto-Calende grave B of 1928, which were attached to iron rings (Pl. 136, 11.13), or like the Slovenian belt pendants mentioned above.

A further bronze disc was actually found on an iron rod which may have acted as an axle (Horváth 1969, 116, fig. 11, 1–2). The disc, however, was only about 46 mm in diameter and was certainly too small for a full-size wagon. Sadly the disc and 'axle' are unprovenanced, and may not date to the Hallstatt period (Horváth 1969, 118 and note 83; the objects probably do not come from the grave from Boba).

There is only one grave in which disc-like rings may have been used as wagon components. Eight iron discs were found in grave I from Nagybaráti, with an external diameter of ca. 82 mm and internal diameters of 33–39 mm (Börzsönyi 1909, 253, fig. 18). These discs also had thickened internal rims. The fact that eight discs were found would correspond to their use as nave-caps or washers on a four-wheeled wagon. However, they would require wooden axles 33–39 mm in diameter which seems too small for a full-size wagon. Therefore it remains doubtful whether even the discs from Nagybaráti were wagon parts.

CHAPTER 6

The Hallstatt Wagon: classification of the spoke fittings, axle-caps and linchpins

6.1 SPOKE FITTINGS

There are two main types of metal spoke fittings used on wagons of the Hallstatt period: ribbed cylinders of bronze or iron sheet (typical for wheels with Cannstatt naves), or simple undecorated bronze sheet, either covering the whole spoke or forming short cuffs at their bases (found with naves of types Ins, Erkenbrechtsweiler, Vilsingen and Repperndorf).

The decoration of the spokes on wheels with Cannstatt naves often repeats the type of decorative ribbing of the nave fittings. Thus in the case of graves 1 and 2 from Apremont, the spokes were covered by iron cylinders which were decorated with round hollow iron ribs similar in shape to the rounded ribs of the naves (grave 1: Pl. 6B, 7; grave 2: Pl. 7, 5–6). The same is true for wheel type i from the Býčí-skála cave, where both the naves and spokes are covered with bronze sheet decorated with triangular ribs (Pls 100–101). Ludwigsburg (Pl. 45, 7–8.11), Býčí-skála, wheel type ii (Pls 102–3) and Hochdorf (Biel 1985a, 156–7, fig. 180) also have the same kind of decoration on the naves and spokes. The same could also be true for another wagon from the Býčí-skála cave, if the spoke fittings on Pl. 104 belonged with the nave fragment on Pl. 105, 7 (in this case the nave on Pl. 105, 1, with undecorated bronze sheet, could belong with the ribbed bronze spoke collars on Pl. 105, 4–5). On the other hand, the spoke fittings from Augsburg-Wellenburg, slightly conical iron collars, bear rounded ribs which contrast with the smooth iron sheet of the naves (Pl. 60, 10.12–16). And the richly profiled ribbing on the iron spoke cylinders from Sainte-Colombe, 'La Butte', may not have been repeated on the nave fittings of the wagon, although this remains uncertain because the exact original appearance of the naves is unknown (Pl. 16, 16; the reconstruction of the nave by Joffroy is doubtless incorrect: *ibid.* 1958, 79, fig. 16, 8). As for the wagon from Uttendorf, while the naves were decorated with rounded ribbing (Pl. 129, 1), the spokes probably bore ribs with triangular cross-section (Pl. 130A, 6).

Although the type of decoration found on these ribbed spoke fittings is not always identical with that on their naves, the naves were without exception of Cannstatt type. This fact assumes importance when the wagons from Hundesingen, 'Talhau', tumulus 4 and Oberstetten tumulus 2 are considered. In the case of Hundesingen tumulus 4 the naves and tyres of all four wheels had been removed by grave robbers, leaving only the spoke fittings remaining from the wheels. The fact that the spokes were

fitted with iron collars with ribbed decoration, similar to those from Augsburg-Wellenburg, strongly suggests that the naves were of Cannstatt type (Pl. 37A). The same argument could be suggested for Oberstetten tumulus 2, if the ribbed iron fragments can be accepted as spoke fittings (Pl. 37C, 1.3). In this way we can postulate the addition of two further wagons with the Cannstatt nave type.

The most remarkable spoke decoration of this kind is on wheel type i from the Býčí-skála cave (Pl. 101). Here the ribbing on the spokes is spaced in such a way that it produces a spiral effect when the wheels rotated at a speed of at least 14 km per hour. This was an impressive achievement – the design of the wheels requiring mathematical expertise – once again emphasising the importance accorded to the appearance of the ceremonial wagon.

Undecorated bronze spoke sleeves seem to have been characteristic for wheels with Vilsingen naves. All three wagons with this nave type had such spoke fittings. They were best preserved in the grave from Vilsingen where the full length of the spokes was covered by a single piece of bronze sheet, the seam of which was fastened by a row of small bronze nails with domed heads (Schiek 1954, 154, fig. 3, 14; pl. 25, 9–10). Exactly the same sort of bronze sleeves were used on the spokes from Hügelsheim, 'Heiligenbuck' (Pl. 38, 9–10). The spoke sheathings from Ebingen have not survived, but a few fragments were drawn by the excavator and they were probably of the same sort used in the other two graves with Vilsingen naves (e.g. Pl. 27A, 8).

Only one fragment of bronze sheet remains from the spokes of the wagon from Sulz am Neckar (Pl. 50A, 3). It is not certain whether the bronze sheet was confined to the base of the spokes, or whether their whole length was encased in bronze. It is interesting to note that Uffing tumulus 11 also contained remains of spokes covered with bronze sheet (Pl. 90B, 4; Naue 1887a, pl. 38, 8). If the bronze fragments found in this grave really indicate a nave of Erkenbrechtsweiler type, Uffing 11 would join Sulz am Neckar in documenting bronze-clad spokes on wheels with this nave type. According to the excavator the whole length of the spokes on the wagon from Dittenheim was covered with bronze sheet. Today, only a mass of small fragments of bronze sheet remain, presumably deriving from the spoke sleeves (including Pl. 69, 20–21). The wagon from the lower grave of Ins tumulus VI of 1848 had spokes which were partially covered with bronze sheet (Drack 1958a, 36, fig. 36, 5). The spokes

seem to have had short cuffs, one size for the base of the spokes and another with smaller diameter for the outer ends of the spokes.

Bronze sheet spoke cuffs are also attested for the wagons from Riedenheim, 'Fuchsbühl' (Pl. 88B) and Görau tumuli 1 and 3 (only those from tumulus 3 survive: Pl. 98, 4–14). While the naves from Görau seem to have been of Repperndorf type, those from Riedenheim were removed along with the tyres by grave robbers. It is interesting to note the similarity of the Riedenheim and Görau spoke cuffs, and it could be suggested that the Riedenheim and Görau wagons indicate a related Franconian workshop tradition.

Small bronze cuffs were also used to decorate the bases of the spokes on the wagon from Vix (Pls 20B; 21, 3–5). The cuffs were made in two parts: a narrow ribbed bronze ring and a bronze ring with long triangular teeth, each 'tooth' being nailed to the spoke. In contrast, the spokes from the central grave of the 'Magdalenenberg' near Villingen-Schwenningen were sheathed with leather, which was glued to the spoke with pitch and fastened by two rows of iron nails (Pl. 52, 1). Finally, the spokes in the grave of 1873 from Buchheim were apparently sheathed with bronze, but since all the finds from this grave have been lost it is impossible to judge their original appearance.

6.2 AXLE-CAPS

6.2.1 *Type Wellenburg*

Axle-caps are most common on wheels with naves of Cannstatt type, on which they are represented 10 times (Fig. 72, 1.3–11). These axle-caps form a relatively homogeneous group, always made of iron and rather uniform in shape. An eleventh, very similar axle-cap from Hundersingen, not associated with Cannstatt nave fittings, clearly belongs to this group (Fig. 72, 2; Pl. 35A, 2).

The simplest examples have a flat flange and a hemispherical boss, from Augsburg-Wellenburg (Fig. 72, 1; Pl. 60, 1–2) and from the Hundersingen grave (Fig. 72, 2; Pl. 35A, 2). A similar axle-cap comes from Donauwörth, 'Riegelholz', tumulus 10, where the flange is slightly conical and the boss has a slightly pointed shape (Fig. 72, 3; Pl. 70B, 7). Otherwise, the axle-caps always have a neck between the flange and the bulbous head. The examples from Ludwigsburg (Fig. 72, 4; Pl. 45, 1–2.11) and Hochdorf (Biel 1985b, pl. 41) seem to be identical in shape. The flanges have a stepped profile and the necks are slightly conical. The top of the bulbous head is also stepped in profile. The axle-caps from Sainte-Colombe, 'La Butte', had a similar appearance, although they were made in a different way (Fig. 72, 5; Pl. 16, 2). Once again, the flange had a stepped profile and the neck was slightly conical, but in this case the head was made separately and joined to the neck with bronze solder. Like Ludwigsburg and Hochdorf the bulbous head also had a stepped profile and a hemispherical knob at the apex, but here the sides of the head were also ribbed. The axle-caps from Asperg (Fig. 72, 6; Pl. 31A), Bad Cannstatt (Fig. 72,

7; Paret 1935a, pl. 6, 3), Allenlütten (Fig. 72, 8; Drack 1958b, 3, fig. 2), Niederweiler (Fig. 72, 9; Driehaus 1966b, 39, fig. 4, 6) and Apremont grave 2 (Fig. 72, 10; Pl. 7, 4) had the same form as the Ludwigsburg and Hochdorf caps, but lacked the stepped profile of the latter examples. The example from Apremont grave 1 (Fig. 72, 11; Pl. 6B, 4) had a slightly more curvaceous shape. A further axle-cap of the Wellenburg type may be represented by the iron fragment from Cordast, Kanton Freiburg (Schwab 1976, 18, fig. 5, 18).

The axle-caps from Vix are certainly related to the above group, even though they are exceptional, being made of bronze (Fig. 72, 12; Pl. 21, 1). They have the same necks and bulbous heads seen on the Wellenburg axle-cap type, but lack exact parallels. They have a broad flat flange and are ribbed at the base of the neck and at the broadest part of the bulbous head.

Further axle-caps are related to the Wellenburg type, although they are smaller (Fig. 72, 16–20). The example from Apremont grave 2 (Fig. 72, 18; Pl. 7, 7), for example, being identical in shape to the larger axle-caps from Ludwigsburg and Hochdorf. Two others, from Wohlen (Fig. 72, 16; Drack 1958a, 31, fig. 29, 1a) and Apremont grave 1 (Fig. 72, 17; Pl. 6B, 3) have a bulbous shape also known in the Wellenburg type (Fig. 72, 8–11). The small axle-caps from Vix (Fig. 72, 19; Pl. 21, 7) and Sainte-Colombe, 'La Butte' (Fig. 72, 20; Pl. 16, 6) have different shapes. A sixth example of these small axle-caps comes from Hochdorf (Biel 1985a, 92, fig. 104), with a simple bossed shape like Fig. 72, 1. On the Hochdorf wagon the small caps were fitted to the ends of the axle which articulated the wagon pole, and the same function can be assumed for the other small axle-caps mentioned above (see below, Ch. 9.4).

Of the six wagons which had such small axle-caps, four had naves of Cannstatt type (Apremont graves 1 and 2; Fig. 72, 17–18; Sainte-Colombe, 'La Butte': Fig. 72, 20; Hochdorf). The naves of the Vix wagon are unique (Fig. 72, 19), and nothing is known of the wagon from Wohlen where the small axle-cap (Fig. 72, 16) was the only surviving wagon find.

6.2.2 *Type Wijchen*

Another type of axle-cap is found in the graves of Vilsingen, Kappel tumulus 3 and Wijchen. The Vilsingen (Fig. 72, 13; Schiek 1954, pl. 24) and Wijchen axle-caps (Fig. 72, 14; Pl. 4) are made of bronze and are almost identical in shape. Both have a broad flat flange and a cylindrical neck terminated by a flat disc decorated with stamped dots-and-circles. On the Vilsingen examples stamped dots-and-circles are also found on the flanges of the axle-caps. Although the Kappel caps are made of iron, they must be assigned to the same type (Fig. 72, 15; Pl. 42, 5–6). The necks of these axle-caps differ slightly, having a pronounced conical shape. But dot-and-circle decoration is once again used to decorated the terminal disc and flange – in this case executed with inlaid bronze. A fragment of iron decorated with inlaid bronze dot-and-circle motifs from Uttendorf tumulus 2 (Pl. 128, 3) may

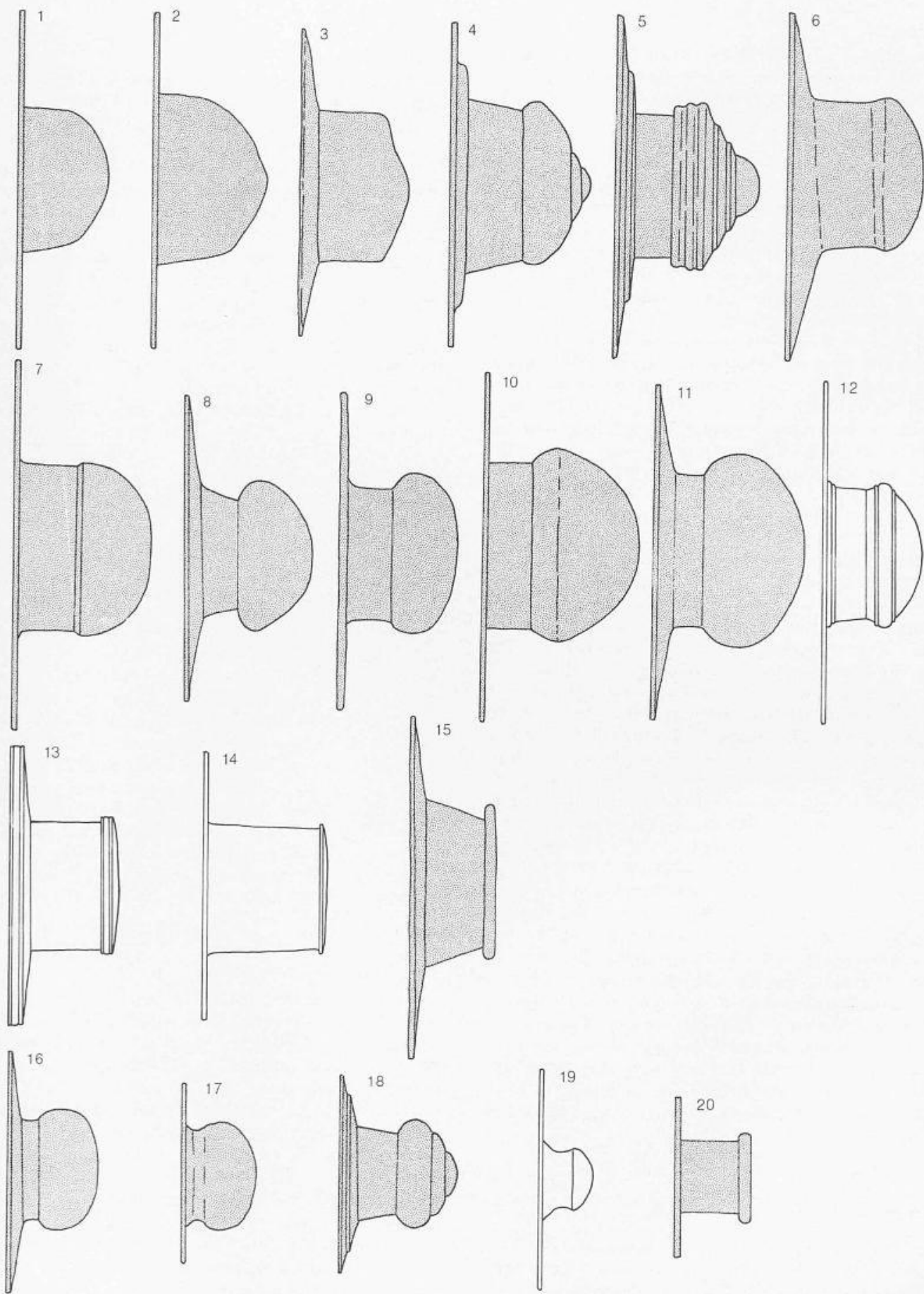


Fig. 72 Axle-caps: 1 Augsburg-Wellenburg; 2 Herbertingen-Hundersingen, 'Gießbübel', tumulus 1, secondary grave 1; 3 Donauwörth; 4 Ludwigsburg, 'Römerhügel'; 5 Sainte-Colombe, 'La Butte'; 6 Asperg, 'Grafenbühl'; 7 Suttgart-Bad Cannstatt; 8 Allenlүften; 9 Niederweiler; 10 Apremont grave 2; 11 Apremont grave 1; 12 Vix; 13 Inzigkofen-Vilsingen; 14 Wijchen; 15 Kappel-Grafenhausen, tumulus 3; 16 Wohlen; 17 Apremont grave 1; 18 Apremont grave 2; 19 Vix; 20 Sainte-Colombe, 'La Butte'.

— Iron is stippled, bronze is white. — Scale 1:3.

come from an axle-cap like those from Kappel. However, the fragment would have to come from the flange of the axle-cap, which would be at least 35 mm wide, perhaps too broad for this type of fitting.

6.2.3 Simple domed axle-caps

The only other possible axle-caps come from Hermrigen and Grandvillars. Both wagons had naves of the Grandvillars type as well as domed iron objects which seem to correspond in size to the naves' axle-channels (Grandvillars: Pl. 9B, 3; Hermrigen: Drack 1958a, 24, fig. 22, 2). The circular iron domed objects could have been fitted to the ends of the axles, perhaps as decoration. The Hermrigen piece has a central circular hole, which could have accommodated a nail. The Grandvillars example, however, was badly preserved and the central part was covered by an oxidised concretion; nevertheless it does not seem to have had a hole and it is uncertain how it could have been held to the axle.

6.2.4 Summary

The type Wellenburg axle-caps found with Cannstatt naves form a very well-defined group, making it likely that this type of nave was used on the wagon from Hunderingen, 'Gießbübel', tumulus 1, secondary grave 1, where diagnostic nave fittings have not survived. The same argument can be put forward for the small axle-cap from Wohlen, in which case the wagon also probably had naves of Cannstatt type. It is tempting also to try to suggest the type of nave used on the wagon from Wijchen. The other graves with axle-caps of type Wijchen (Vilsingen, Kappel tumulus 3 and possibly Uttendorf tumulus 2) all seem to have had naves of the conical group, although the naves all belong to different types. It is therefore most likely that the Wijchen wagon was also provided with conical naves although it is, of course, impossible to be at all certain. It was argued above (Ch. 5.10) that naves of types 1-9 could not have been used with the Wijchen axle-caps - and so it seems most likely that the Wijchen wagon had naves similar to those of types Vilsingen and Winterlingen, or those from Hohmichele grave VI. It is interesting that the simple domed objects from Hermrigen and Grandvillars were used with the same kind of nave, possibly indicating related wagon workshops. Again the axle-caps from Vix, although related to the Wellenburg type, were exceptional being made of bronze - corresponding to the exceptional character of the Vix naves.

6.3 LINCHPINS

Linchpins are found in at most 59 wagon-graves of the Hallstatt period. Four broad groups can be recognised, which will be discussed under the following headings: Small-Headed Linchpins, Crescent-Headed Linchpins, Bohemian Linchpins, and other Large-Headed Linchpins.

6.3.1 Small-headed linchpins

On axle-caps of type Wellenburg, only small-headed linchpins were used. Small-headed linchpins were also found on the axle-caps from Vix and Vilsingen and possibly in the grave of Salzburg-Taxham.

The linchpins associated with Wellenburg axle-caps are all of iron. Two have semicircular heads: the example from Ludwigsburg being stepped in profile (Pl. 45, 3), and that from Hochdorf being plain (Biel 1985b, pl. 41). The badly preserved example from Augsburg-Wellenburg could have had a similar semicircular shape (Pl. 60A, 1). Linchpins with small crescent-shaped heads were used on two French wagons: in Vix made of bronze and iron (Pl. 21, 2) and in Apremont grave 1 made of iron (Pl. 6B, 4). The heads of the Vix linchpins have a stepped profile like those from Ludwigsburg.

Otherwise, the linchpins on Wellenburg axle-caps have small globular heads: Niederweiler (Driehaus 1966b, 39, fig. 4, 6), Donauwörth (Pl. 70B, 7). The linchpin from Asperg, 'Grafenbühl', seems to have a simple 'T'-shaped head, but could originally have resembled the examples from Apremont grave 1 and Vix (Pl. 31A).

The linchpins from Vilsingen were made of iron but had spherical bronze heads (Schiek 1954, pl. 24). These linchpins have no exact parallels, and stand in stark contrast to the large trident-shaped linchpins which were used on the other two axle-caps of Wijchen type (Wijchen and Kappel tumulus 3). A small-headed linchpin was also possibly used on the wagon from Salzburg-Taxham, which had a variant of the Breitenbronn nave type (Pl. 131A, 2). A small iron fragment adhered by corrosion to the front of the nave-cap. The fragment seems to have a small globular head, although it is also possible that the linchpin originally had a large decorative head which has not survived. In fact, this linchpin seems to be too small to have kept a nave on its axle: otherwise small linchpins were never used alone, but always in conjunction with an axle-cap. It could therefore be argued that the Salzburg-Taxham linchpin originally had a larger head.

6.3.2 Crescent-headed linchpins

The crescent-headed linchpins are all made of iron. They were used on five different wagons: Hohmichele grave VI (Pl. 27B, 1-3), Weinsfeld (Pl. 76, 12-13), Repperndorf (Pl. 81, 1), Praha-Bubeneč (Pl. 122B, 2) and Ins, tumulus of 1849 (Drack 1958a, 24, fig. 22, 4-6). The badly preserved linchpins from Kladruby (Pl. 115, 10) and from an unprovenanced find in Württemberg (Pl. 55C) could represent two more examples of this type. Crescent-headed linchpins have been found twice with Repperndorf naves (Praha-Bubeneč, Repperndorf), once with naves of type Kicklingen (Weinsfeld) and perhaps once with type Grandvillars (Ins tumulus of 1849). It is interesting to note that these naves, as well as the unique naves from Hohmichele grave VI, not only hold the same type of linchpin in common but are also related in having undecorated iron nave-head rings. Perhaps these linchpins and naves document a discrete tradition of wagon

construction. Note, however, that the Repperndorf wagon was provided not only with a crescent-headed linchpin but also with a variant of the Bohemian type (Pl. 81, 6).

6.3.3 *Bohemian linchpins*

These linchpins form a very characteristic group, consisting of iron linchpins whose shaft is divided and bent into two large loops. The ends of the loops are bent into rings and hammer-welded together. The rings normally carry jangling pendants – either pendent rings or looped triangular pendants. This type of linchpin is known from the following graves:

- 1) Großebstadt, cemetery II, grave 4 (Pl. 74C).
- 2) Hradenín grave 5 (Pl. 108B, 1–7.9–11).
- 3) Hradenín grave 18 (Pl. 108C, 2).
- 4) Hradenín grave 28 (Pl. 111A, 3.6–12).
- 5) Hradenín graves 30 and 33 (Pls 111B; 112A).
- 6) Hradenín grave 46 (Pl. 114A).
- 7) Hradenín grave 58 (Pl. 114B).
- 8) Miškovice (Pl. 119B, 1–6).
- 9) Nehvizdky grave 1 (Koutecký and Špaček 1982, 68, fig. 11, 25–26).
- 10) Nehvizdky grave 2 (Koutecký and Špaček 1982, 71, fig. 14, 1–2).
- 11) Nymburk-Habeš (Pl. 120, 3–4).
- 12) Ohrada u Kolína (Pl. 119C, 1).
- 13) Pašovice (Beneš 1966, pl. 6, 3–4).
- 14) Plaňany, from seven graves (Pl. 121).
- 15) Rvenice grave 1 of 1963 (unpublished).
- 16) Straškov-Račíněves (Pl. 126A, 1–2.4).
- 17) Vikletice grave 17 of 1965 (Pl. 127A).

Of the linchpins listed above, only those from Hradenín grave 18 are rather untypical, being more elaborate, composed of four large loops instead of the usual two. Another variant of the Bohemian type comes from Repperndorf (Pl. 81, 6). The loops of this linchpin are small and irregular in shape. The ends of the bent iron rods meet in a third central loop. This linchpin was apparently used along with a crescent-headed linchpin, on the same wagon. The linchpins from Hallstatt grave 507 also seem to be related to the Bohemian type, although they are of cast bronze (Pl. 127D). The head of each linchpin had two large loops, as on the Bohemian type, but in addition a knob terminated the top of the head and a third loop was positioned between and at right-angles to the normal pair of loops. A ring carrying a subtriangular piece of bronze sheet was suspended in each loop. The tip of the shaft of the linchpin was also curled into a loop and carried a bronze ring and subtriangular pendant, which would have made the linchpin impossible to use unless the ring and pendant were removed every time it was fitted to the axle.

Bohemian linchpins have only been found with Breitenbronn and Erkenbrechtsweiler nave fittings (Breitenbronn type: Straškov-Račíněves; Variant of the Breitenbronn type: Hradenín grave 46; Erkenbrechtsweiler type: Hradenín grave 28, Nymburk-Habeš). Axle-caps do not seem to have been used with this type of linchpin.

6.3.4 *Large-headed linchpins*

Hradenín grave 24 contained four iron linchpins with large flat heads shaped like a double axe. The long sides of the head were thickened and the two lower corners were perforated to hold a pair of iron rings, each of which held three more pendent iron rings (Pl. 109, 2.6–8). There are three more linchpins of a similar type in Kolín museum, which must have come from one of the unpublished Hradenín graves (Pl. 107B). The heads of these linchpins were more rounded in shape but the upper edge was thickened, as in grave 24. The two upper corners of the heads were perforated and held iron rings, from each of which hung three pendent iron rings. The linchpins in Hradenín grave 24 were used on wheels with iron nave-stock rings and nave-neck collars, metal axle-caps were not provided.

The wagon from Lengenfeld had large linchpins made from bent iron rods which were round in cross-section (Pl. 93, 6). The lower part of the shaft is not fully preserved, but the upper part forked and was bent into a triangular shape with the corners forming loops. Where the head met the shaft, the fork of the linchpin was covered with cast bronze, which presumably represents a repair. The corner loops of the linchpin held looped triangular pendants. The fragmentary remains from Dittenheim probably come from a similar sort of linchpin (Pl. 69, 11–19.25). Three fragments seem to come from the looped corners of the triangular head (Pl. 69, 12.17–18), which held looped triangular pendants (Pl. 69, 11.14.19.25). These large triangular linchpins are documented with bronze nave-caps of Lengenfeld type and naves of type Ins. However, they never seem to have been used in conjunction with axle-caps.

Large trident-shaped linchpins have been found in four graves: Gottesberg tumulus 1 (Pl. 84A, 1–5.7–9), Markhof tumulus of 1887 (Pl. 89A, 4), Kappel tumulus 3 (Pl. 42, 6) and Wijchen (Pls 1–3). The examples from Gottesberg and Markhof are very similar: the upper part of the shaft was broad and flat and divided into a trident shape, which was joined at the top by a horizontal crossbar. Pendent iron rings were suspended from the head of the linchpin. On the Gottesberg linchpins the trident forks extended above the crossbar for about 25 mm. The ends of the forks were hammered flat – clearly showing that they must have held some sort of decoration, probably of an organic material (Pl. 84A, 1.3.4). In the case of Kappel, the author was able to find remains of only one linchpin, attached to its axle-cap (Pl. 42, 6). Only a fragment survived, forming a wide 'T'-shape which no doubt originally continued upwards to form a trident.

The finest trident-shaped linchpins come from Wijchen and are cast in bronze (the cultural relations evidenced by these linchpins are discussed in Ch. 11.3). They have the same shape as the pieces from Gottesberg and Markhof with three forks and a horizontal crossbar at the top. Four rings were cast together with the linchpin – on the top of each trident fork and on the base of the middle fork. These rings each held two or three pendent bronze rings. Above

the crossbar each trident fork was terminated by a small zoomorphic head. The position of the heads corresponds to that of the decoration which clearly once existed on the Gottesberg linchpins – naturally it is impossible to tell whether zoomorphic heads were also used in this case (Pl. 84A, 1.3–4).

The four linchpins from Wijchen are not identical. Pin 1 is much finer than the others, with its lighter construction, well-made rectangular shaft and the form of its zoomorphic heads (Pl. 1, 1). These heads have sharp features with large pointed ears, long angular noses and deep excised eyes. The hairstyle is complex. The hair is parted by a wide central rib, to either side of which the hair is shown by diagonal lines. The back of the cap-shaped hairstyle is separated from the plait, which is decorated with alternating groups of diagonal engraved lines. In contrast, the other linchpins have a heavy, clumsy construction and shafts with thick, more rounded cross-sections (Pls 1, 2; 2; 3). The heads on these linchpins are of a completely different type, with small button-shaped noses and ears, eyes formed by simple hollows and the mouth crudely denoted by two or three crossed lines. The hairstyle is also different: the hair now has a simple central parting (without the rib seen on the first linchpin) and diagonal lines to either side, extending the whole length of the plait (however pin 2, on two of its plaits, retains the alternating groups of diagonal lines seen on the first linchpin). One suspects that pins 2–4 are copies of pin 1.

The linchpins from Gottesberg, Markhof and Wijchen

are not only related by their trident shape, but all three probably also carried decoration at the top of the trident forks. Whether this was true for the fragment from Kappel is unknown. Axle-caps were only found in the graves from Kappel and Wijchen and, although made of different metals, they have both been assigned to the Wijchen type (see above). Nave fittings, however, were only found with the Kappel linchpin, and these were of Winterlingen type.

The following graves may also have contained large-headed linchpins, but the few fragmentary remains do not allow a certain classification: Hügelsheim (Schiek 1981, 282, fig. 7, 4.5.12); Immendingen-Mauenheim, tumulus M, grave 3 (unpublished); Immendingen-Mauenheim, tumulus N, grave 3 (unpublished); Villingen-Schwenningen, 'Magdalenenberg', grave 1 (Pl. 52, 2); Aislingen, 'Oberes Ried', tumulus 1 (Pl. 56A, 8); Beratzhausen grave 3 (Pl. 63, 3–4.7–8.12); Ehingen-Belzheim, 'Mähder', tumulus 104 (Pl. 71A, 7–8); Tucheňovice (Koutecký 1983, 245); Vikletice grave 138 of 1963–4 (triangular iron pendants looped in threes on iron rings, unpublished); Ins, tumulus VI of 1848, lower grave (Drack 1958b, pl. 14, 109–10). The looped nails bearing suspended rings, from Seloutky grave 2, okr. Prostějov, north Moravia, may also have functioned as linchpins, although the author favours a use as jangling attachments on a yoke (Říhovský 1979, pl. 83E, 9). The Villingen and Beratzhausen fragments (Pls 52, 2; 63, 3–4.7–8.12) could be the remnants of linchpins like the example from Lengenfeld (Pl. 93, 6–7).

The Hallstatt Wagon: classification of the wagon-box fittings

Most of the wagon-box ornaments can be accommodated in the following six typological groups (types i–vi). Each group comprises a combination of decorative fittings which recurs on a number of different wagons. The typological classification is summarised in a table, demonstrating the six distinct groups of fittings (Fig. 84).

7.1 WAGON-BOX FITTINGS OF TYPE i

The first type of wagon-box decoration is documented in the Hallstatt period only in the grave from Wehringen, 'Hexenberg', tumulus 8. The sides of the box were evidently decorated with simple bronze phalerae, about 100 mm in diameter, which were affixed by bronze nails at least 50 mm in length (Pl. 96, 18–23). The rear end of the wagon-box was furnished with a bronze-clad wooden structure with four bipartite decorative discs (Pl. 96, 11–17).

As explained in Ch. 3.6, the Wehringen fittings were made in the tradition of the late Urnfield Bad Homburg group. Similar box fittings are found in the hoards from Azay-le-Rideau (Fig. 45, 1), Bad Homburg (Figs 37, 1–2.6; 38, 4–9.15–18), Choussy (Fig. 42, 2), Neuilly-sur-Barangeon (Fig. 41, 3–7), Notre-Dame-d'Or (Fig. 45, 2–3), Vénat (Fig. 43, 4–6) and Weinheim-Nächstenbach (Fig. 40, 2–5). This type of box decoration lacks further parallels in the Hallstatt period and contributes to the exceptional character of the Wehringen wagon. Nevertheless, general similarities exist with the fittings of type ii – an observation of considerable importance for our interpretation of the earliest wagons of the Hallstatt period.

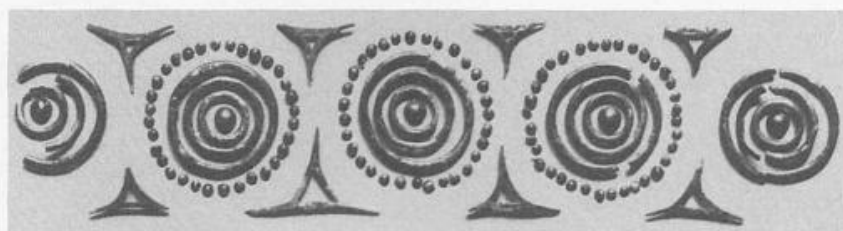
7.2 WAGON-BOX FITTINGS OF TYPE ii

The only modern excavation of a wagon with box decoration of the second type took place in 1984 at Mitterkirchen in Upper Austria (tumulus X, grave 1; see Fig. 217). This excavation is important for our understanding of the second group of box fittings, which may include as many as 17 grave finds (see list below). However in eight cases (10–17), in which the graves only contained remains of these ornaments and no further wagon parts, and the quality of the excavation provided no further illumination, it remains uncertain whether the ornaments in fact came from a wagon and they have not been included in the catalogue of wagon-graves.

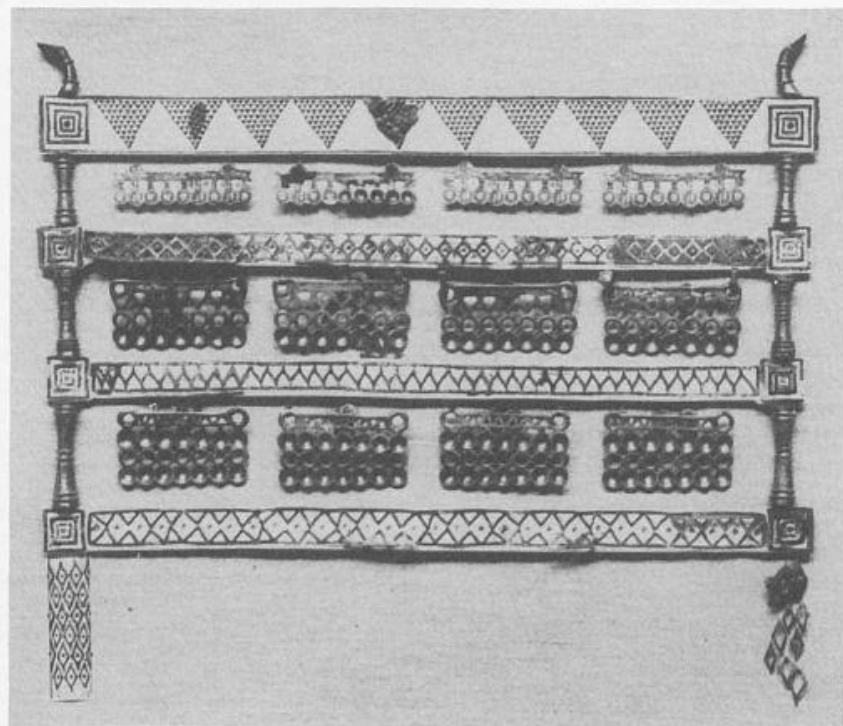
1) *Mitterkirchen, tumulus X, grave 1 (cat. no. 178B)*: In the southern half of the wooden grave chamber in Mitterkirchen tumulus X, grave 1 was an inhumation burial orientated (head) east-west (feet), lying on an elaborate wooden structure (Fig. 217). In front of the east end of the structure was a collection of horse-gear, including characteristic bronze fittings from a wooden yoke. The wooden structure was rectangular and measured about 0.845 m in width, with a length of 1.4 m. The long sides were covered with leather and adorned with numerous bronze ornaments (Fig. 73, 1). At the western end of the structure was a complicated wooden construction with rich bronze decoration, among which openwork cast bronze plaques were predominant (Fig. 73, 2). There were three rows of plaques: each plaque was provided with a pair of triangular pendants and was attached to the wooden construction by looped bronze nails. The rectangular shape and size of the wooden structure (0.845 × 1.4 m) and particularly the fact that a yoke was positioned in front of its eastern end clearly indicates that it should be interpreted as a wagon, or at least a wagon-box.

2) *Neukirchen-Gaisheim, tumulus 6 (cat. no. 129)*: The excavation of Mitterkirchen tumulus X serves to illuminate the results of a number of nineteenth century excavations in southern Germany. The plan of Gaisheim tumulus 6 seems to reflect a similar deployment, albeit here with a different orientation (Fig. 195). At the south side of the grave was the iron and bronze horse-gear (Fig. 195, 1), and a little to the north were the well preserved remains of a wooden yoke (Fig. 195, 6). In the middle of the western half of the grave were the personal goods of the burial (probably an inhumation), including an iron sword and bronze chape, an antler hammer, some bronze pins and a whetstone (Fig. 195, 7.9.13–4). The eastern part of the grave was occupied by a row of pottery vessels (Fig. 195, 2–5.8.11).

Around the personal goods of the burial were numerous bronze knobs (probably originally attached to leather) which, by analogy with Mitterkirchen, could have decorated the sides of the wagon-box. At the northern end of the layer of bronze knobs was a wooden construction decorated with openwork cast bronze plaques (Fig. 195, A) which, again by analogy with Mitterkirchen, would represent the rear end of the wagon-box. Fortunately, the excavator of this grave made a sketch of the wooden construction, which survived with a length of about 750 mm and an average width of about 220 mm (Fig. 196). It must be stressed that although the wooden object was



1



2

Fig. 73 Mitterkirchen, tumulus X, grave 1; bronze decoration from the wagon-box (after Perlwieser 1987). – Not to scale.

provided with bronze plaques resembling *Jochschnallen*, it cannot be interpreted as a yoke because remains of the yoke were already found in the grave to the south of the layer of bronze knobs (Fig. 195, 6; see Torbrügge 1979, pl. 160, 19–28). The north side of the wooden object was fitted with a bronze strip and curved in an 'S' shape (Fig. 196, b). An iron wire was attached to the curved side of the object, and from it hung a row of iron pendants (Figs 74, 2–4; 196, a). The southern side of the object was straight (Fig. 196, e). The surface of the object was decorated with square nailed bronze frames, each with a nail positioned in the middle (Figs 74, 5–10; 196, d), and six pairs of bronze plaques which seem to have been attached to the iron wire along the northern side of the object (Figs 74, 1; 196, c). Thus, like the rear end of the wagon-box from Mitterkirchen, the Gaisheim object was decorated with a combination of openwork bronze plaques and pendants. Furthermore, the square nailed 'frames' from Gaisheim recall the more elaborate circular, triangular and rhomboidal ornaments on the Mitterkir-

chen wagon-box (Fig. 73). These parallels with Mitterkirchen suggest that Gaisheim tumulus 6 contained a wagon. As in the case of Mitterkirchen, here too the position of the yoke provides the strongest argument that the decorated wooden construction should be interpreted as a wagon-box.

Both these graves have wagon-boxes decorated with bronze plaques resembling *Jochschnallen*, which are otherwise generally known as decoration on yokes. Indeed at Mitterkirchen *Jochschnallen* were found on the yoke. A detailed study of *Jochschnallen* from well excavated graves shows that typologically they form a very uniform group (Figs 100, 13–15; 101d). The openwork plaques from the Mitterkirchen wagon are clearly of a different type: apart from their different form and varying sizes it is their method of attachment which differentiates them from the *Jochschnallen*. Whereas *Jochschnallen* are provided on their rear side with rectangular loops for leather reins (see for example Naue 1884, pl. 14, 1–2.4), the Mitterkirchen plaques were fixed to a wooden base by nails. In Gaisheim

it seems that typical *Jochschnallen* had been adapted for their new use as wagon ornaments: they were suspended on an iron wire and attached by iron loops (Fig. 74, 1; Torbrügge 1979, pl. 162, 4.7–12). If, as seems probable, *Jochschnallen* had merely a decorative function on yokes, it would not be unreasonable to expect similar jangling ornaments decorating a wagon-box.

3) *Meßstetten-Hossingen, tumulus 1 (cat. no. 81)*: Another example of this type of wagon comes from Hossingen tumulus 1, again the subject of an early excavation. The results of the excavations, in 1867, are not easy to interpret, but the tumulus certainly seems to have contained an inhumation provided with an iron sword and a bronze pin, which may have been the primary grave. To the north of the inhumation were two wooden boards, densely covered with small bronze knobs and rings (Pl. 46A, 6). Between the boards was stretched a length of bronze wire on which were threaded five pairs of cast bronze openwork plaques (Pl. 46A, 1.3–5.7–10.14–16). The excavators did not record the exact position of the boards and the wire, and it is difficult to judge whether they represent the wagon-box sides. However, there is no doubt about the arrangement of the plaques on a piece of wire nailed to a wooden board (a method of attachment closely paralleled in Gaisheim tumulus 6), and the Hossingen find should likewise be interpreted as a wagon or wagon-box. Although precise information about the Hossingen grave is lacking it seems significant that the burial was, as in Gaisheim, provided with an iron sword and bronze pin.

4) *Olching-Neu Esting, 'Leberberg' (cat. no. 131)*: We are fortunate that an exact plan was made of the grave from Neu Esting, excavated in 1789 (Fig. 197). The western half of the grave contained a four-wheeled wagon and the eastern part was occupied by a large collection of pottery vessels and animal bones. Among the wagon remains was an iron sword and a bronze pin (Pl. 86B, 3) which seem to indicate the position of the burial, presumably an inhumation orientated NNE-SSW (Fig. 197, G–H.K; the bones are marked 'f'). Apart from the iron tyres the western part of the grave contained three wooden boards covered with leather and decorated with numerous bronze ornaments (Fig. 197, C–D and A–B). At first sight the decorated wooden boards could be held to be the remains of a yoke but the long narrow shape of the board 'C–D', as well as its bronze decoration, would hardly be typical. And the position of the board parallel to the inhumation burial would be uncharacteristic. The other two boards, 'A–B', which were almost 1 m long, are also difficult to imagine as part of a yoke.

Instead, the long board 'C–D' can be interpreted as the western side and the two shorter boards, 'A–B', as the rear end of a wagon-box. Like the wagons from Mitterkirchen, Hossingen and Gaisheim, the rear end of this wagon was decorated with openwork bronze plaques, which were apparently arranged in seven pairs in Neu Esting. As in Mitterkirchen the plaques occurred in three sizes and once again they were provided with looped iron nails (Pl. 86B, 1–2.4–5). The eastern side of the box seems not to have

survived, but could be indicated by the position of the phalera 'O' (Fig. 197). The sides of the wagon-box were decorated with small bronze nails with triangular heads, nails with hemispherical heads and nailed phalerae (Pl. 86B, 8–11).

According to this interpretation, the Neu Esting grave contained an inhumation provided with an iron sword and bronze pin lying on a decorated wagon which was positioned with its front pointing to the south. The same interpretation has been offered for the Gaisheim and Hossingen graves: the north-south orientation of all three wagons and the uniform grave-goods (iron swords and bronze pins) deserve emphasis.

Our discussion of these four examples of type ii box decoration raises serious questions. In three cases, the 'wooden constructions' were not provided with metallic wheel fittings and for that reason it was not immediately obvious that they were wagons. Furthermore, the box ornaments of type ii are sometimes similar to yoke fittings and without a reliable plan of the grave finds *in situ* the two groups of fittings could easily be confused. Nevertheless, the graves from Mitterkirchen and Gaisheim, which contained well preserved yokes, clearly demonstrate that we are indeed dealing with two different classes of object.

Fortunately, we are relatively well informed about yokes of the Hallstatt period, and especially those of the phase Ha C. In Ha C, yoke fittings are known from 32 graves, in 16 of which excavations of the yokes *in situ* provide a source of reliable information (for a distribution map of the most characteristic forms of yoke fittings, see Fig. 101d). A detailed study of the yoke fittings shows that they form a remarkably distinct, uniform group of types and it is not difficult to distinguish them from wagon ornaments.

Apart from *Jochschnallen* (Fig. 100, 13–15), the yokes of Ha C were provided with cast bronze oval fittings (Fig. 100, 11), bronze sheet bands with point-boss or ring-boss decoration (e.g. Pl. 83B), and small bronze sheet knobs. Most frequently the bronze sheet knobs are round or oval in shape and each has a pair of tongues (e.g. Pl. 116, 21–25); on three yokes the surface was instead covered with rectangular bronze sheet knobs (Frankfurt-Stadtwald; Plaňany grave 5; Straškov grave of 1911; for references see the Appendix). Occasionally the yokes are associated with iron or bronze chains attached to a central ring (e.g. Hradenín graves 24 and 46; see catalogue). Finally, some yokes had cast openwork bronze fittings with anchor-shaped terminals which must have been attached to the ends of broad leather straps (Fig. 100, 12).

In contrast, nailed rectangular frames, nailed rings, nailed hemispherical bosses and nails with triangular heads, which we have described on our four wagons, have never been found decorating yokes. The wagons' cast bronze plaques are also generally different from those on yokes ('*Jochschnallen*').

These types of ornament, which are apparently typical for the decoration of wagon-boxes, have been found in 13 further graves. Four of the 13 graves have additional wagon fittings and of the remaining nine graves eight also

contain remains of horse-gear. The 13 graves are discussed below.

5-6) *Beratzhausen grave 3 and Velburg-Lengenfeld tumulus of 1870 (cat. nos 107B; 143)*: It seems wise to discuss these graves together, considering the possibility that their contents could be mixed with each other. Both graves contain wheel fittings, and a fragmentary bronze band decorated with a ring-boss (Pl. 93, 9) points to the existence of a yoke. The bronze ornaments include large hemispherical nailed bosses (Fig. 74, 12-13), large and small nailed rings (Fig. 74, 14-15), five different types of nailed bronze discs with openwork spoked wheel designs (Fig. 74, 16-20) and cast bronze openwork plaques (Fig. 74, 11). Good parallels for the plaques, with their looped iron nails, were found in Neu Esting (Pl. 86B, 1-2.4-5). The nailed rings are similar to the smaller examples from Hossingen (Pl. 46A, 6) and are comparable to the decoration of the wagons from Mitterkirchen (Fig. 73, 1) and Gaisheim (Fig. 74, 5-10).

7) *Köngen (cat. no. 77)*: None of the ornaments from this grave were found *in situ*, making definite conclusions difficult. However, the nailed rings, the nailed bronze openwork discs with spoked wheel designs and the openwork bronze plaques suspended from looped bronze nails offer clear parallels for the ornaments from Mitterkirchen, Beratzhausen and Lengendorf.

8) *Meßkirch-Langenhart 'Haggenberg' (cat. no. 79A)*: It seems that the finds from this tumulus should be divided between an upper (Pl. 43B) and a lower (Pl. 44A) wagon-grave. The only objects which can be assigned to the lower grave are leather-covered wooden boards bearing bronze ornamentation. The ornamentation consists of large and small tongued bronze bosses (Pl. 44A, 3-4.8), bronze sheet bands (Pl. 44A, 9-12) and nailed rhomboidal frames (Pl. 44A, 5). Although the tongued bosses set in rhomboidal motifs would be characteristic of a yoke, the bronze bands and nailed frames are atypical. Furthermore the size of the larger board (860 × 570 mm) precludes an interpretation as a yoke. An interpretation as part of a wagon-box, on the other hand, would be supported by parallels for the nailed frames (Pl. 44A, 5) on the wagon-box from Gaisheim (Fig. 74, 5-10).

9) *Hohenstein-Oberstetten tumulus 1 (cat. no. 66A)*: Owing to a poor excavation in 1886 it is impossible to reach satisfactory conclusions about this grave (Fig. 168). Although it seems likely that iron tyres were among the finds, it is not clear whether the 'shield' claimed by the excavators should be regarded as a yoke or possibly the remains of a decorated wagon. Some small bronze sheet bosses would be typical for a yoke (Pl. 37E, 5-6) but the single nailed ring has parallels which definitely decorated wagons (compare Pl. 37E, 7 with Pls 40A, 2-3.6; 46A, 6; 50C, 2).

10) *Moritzbrunn (Kreis Eichstätt, Oberbayern)*: This tumulus was excavated in 1791 and must have contained a very rich grave of the older Hallstatt period (Hager and Mayer 1892, 48-51; Kossack 1954a, 153; Hoppe 1986,

189 = 'Weissenburg'). The horse-gear included bronze toggles (Hager and Mayer 1892, pl. 3, 6.8; Kossack 1954a, 175, fig. 26D, 8-9), bronze rings, bronze ring-footed rein-knobs (Kossack 1954a, 175, fig. 26D, 6), a rein-knob with two loops (ibid. fig. 26D, 5) and 44 hemispherical looped rein-knobs (Hager and Mayer 1892, pl. 3, 13). The yoke was relatively well preserved and had a leather cover set with two sizes of bronze tongued knobs (ibid. pl. 3, 1-3). On or by the yoke were seven bronze *Jochschnallen* (ibid. pl. 3, 4-5; Kossack 1954a, 175, fig. 26D, 12; Hoppe 1986, pl. 151, 2). Apart from the horse-gear, the yoke, a nordic fibula and a pottery vessel (Hager and Mayer 1892, pl. 10, 5), the grave contained pieces of wood covered with bronze ornaments. The excavator described pieces of wood decorated with 990 bronze nails with triangular heads (Fig. 74, 23.25-7). The triangular heads of the nails were arranged to form the same pattern as on the wagon from Neu Esting (compare Fig. 74, 23.27 with Pl. 86B, 10). The wooden objects were also decorated with wheel-shaped ornaments fixed by nails; in each of the open quarters of these ornaments was fastened a flat decorative knob (Fig. 74, 28). Furthermore, the grave contained 17 fragments of bronze plaques bearing openwork decoration similar to the *Jochschnallen* (Fig. 74, 21.22.24). But whereas the *Jochschnallen* had rectangular loops on their rear sides, the plaques were attached by iron rings (Hager and Mayer 1892, 49-50). According to the published drawings of the plaques, two different sizes are represented, one wider with six rows of bosses and rings (Fig. 74, 21.24) the other smaller with only four rows (Fig. 74, 22). Similar plaques, again attached by rings or looped nails and occurring in different sizes, have been mentioned above from Mitterkirchen and Neu Esting.

The yoke from Moritzbrunn had typical bronze ornamentation and typical *Jochschnallen*. There is no reason to think that the wheel-shaped ornaments, openwork bronze plaques and nails with triangular heads were attached to it. Therefore it seems certain that apart from the pottery, horse-gear and yoke, the grave contained another wooden object: probably a wagon, with bronze decoration paralleled, for example, in Mitterkirchen, Neu Esting, Beratzhausen and Lengendorf (N.B. for the results of subsequent research on the Moritzbrunn finds, see Addenda).

11) *Thalmässing (Kreis Roth, Mittelfranken)*: This grave was uncovered by a farmer in 1881. Apart from bronze pins and toilet implements (Hoppe 1986, pl. 107, 1-3), most of the finds came from the horse-gear (ibid. pls 107, 7-28; 108, 1-5.7-8) and yoke. The yoke fittings included two oval bronze rosettes (ibid. pl. 108, 12-13), six *Jochschnallen* (ibid. pl. 109, 1-6) and 36 large and 278 small bosses (ibid. pl. 108, 6.9). Otherwise the grave contained 14 square bronze nailed frames (Fig. 74, 32-4) and two riveted bronze sheet 'clamps' (Hoppe 1986, pl. 108, 10-11). The function of the clamps is uncertain, but parallels for the nailed frames are known from Gaisheim (Fig. 74, 5-10) where they probably decorated the wagon-box.

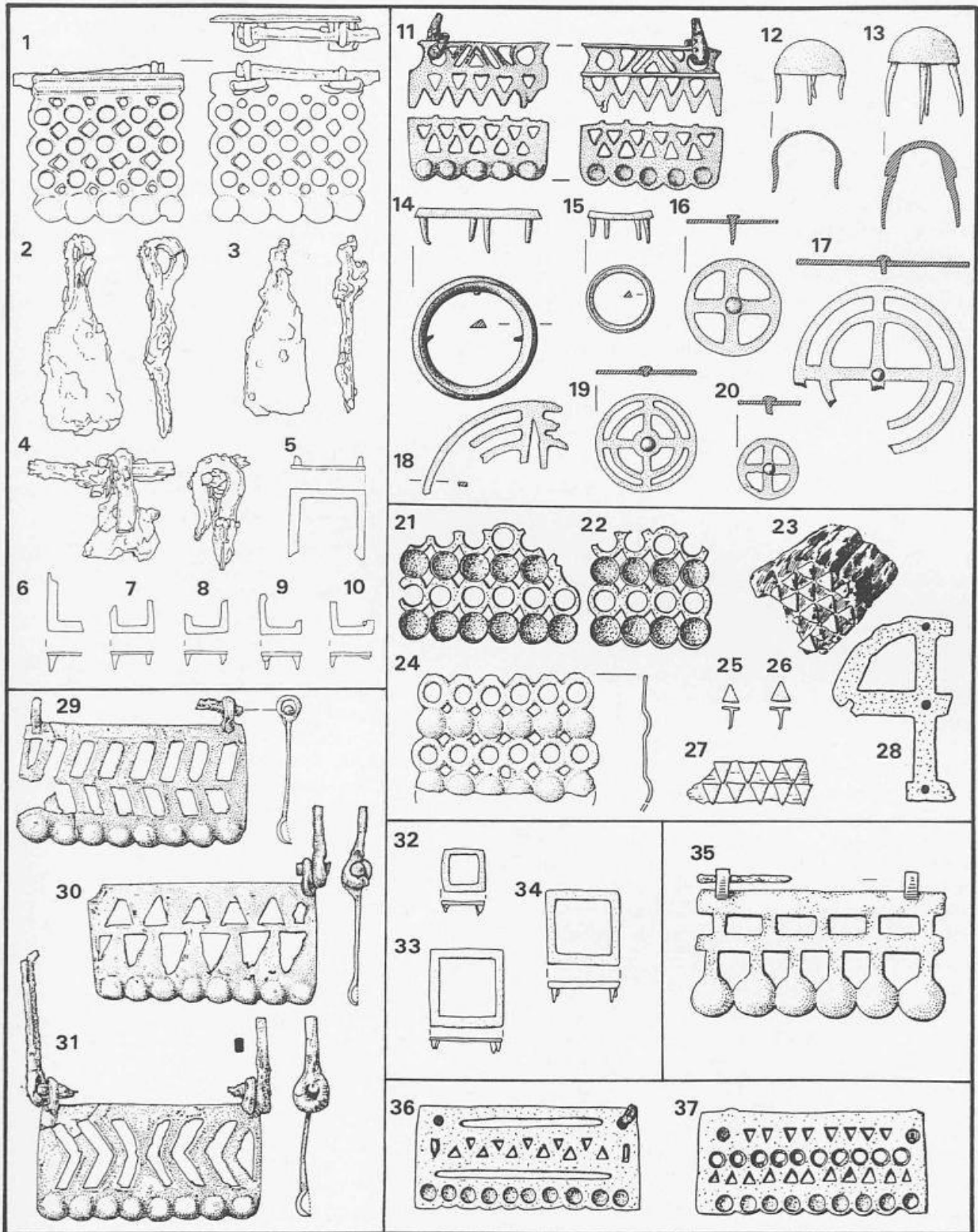


Fig. 74 Elements of type ii wagon-box decoration: 1-10 Neukirchen-Gaisheim, tumulus 6; 11-20 Beratzhausen grave 3; 21-28 Moritzbrunn; 29-31 Unterwiesacker, tumulus 4; 32-34 Thalmässing; 35 Unterwiesacker, tumulus 3; 36-37 Fürstfeldbruck (after Geupel 1975; Hager and Mayer 1892; Hoppe 1986; Kossack 1954a; *ibid.* 1959; Torbrügge 1979). - Scale 1:2.

12) *Unterwiesacker tumulus 3 (Kreis Parsberg, Oberpfalz)*: Apart from an iron sword, a bronze razor, an iron knife, some toilet implements and pottery, this grave contained various bronze rings, fragmentary knobs and five openwork bronze plaques (Geupel 1975, 165; Torbrügge 1979, 319–321). Each plaque is provided with a pair of loops. The plaques obviously hung from an iron wire, which also survives in fragments (Fig. 74, 35). The method of attachment of the plaques is paralleled in Gaisheim (Fig. 74, 1) and Hossingen (Pl. 46A, 1–5.7–10.14–16), and the form of the plaques is comparable to examples from Blotzheim (Pl. 8B, 10).

13) *Unterwiesacker tumulus 4 (Kreis Parsberg, Oberpfalz)*: This grave contained an iron sword and bronze chape, bronze pins and toilet implements, three bronze vessels, pottery vessels and horse-gear (Geupel 1975, 166–71; Torbrügge 1979, 319–21). Furthermore the grave contained a yoke, the fittings of which include two oval rosettes (Torbrügge 1979, pl. 89, 12), 10 *Jochschnallen* (ibid. pl. 88, 5), two openwork bronze strap terminals with anchor-shaped ends (ibid. pl. 89, 15), bronze knobs (ibid. pl. 90, 14–15) and possibly a number of pendent bronze and iron rings (ibid. pl. 89, 1–9.13–14). The grave also contained five bronze plaques with openwork decoration (Fig. 74, 29–31) which seem, like those from tumulus 3, to have hung from an iron wire. In Unterwiesacker tumulus 4 the fact that a set of 12 *Jochschnallen* was already provided for the yoke suggests that the five openwork plaques had some other function, possibly as decoration of a wagon.

Concerning these two graves from Unterwiesacker it is important to recall Torbrügge's suspicion that the Unterwiesacker finds may in fact have come from the cemetery of Pilsach-Niederhofen (1979, 319–20). Torbrügge noted that whereas the Niederhofen graves include wagon fittings (see cat. no. 132) and remarkably numerous bronze vessels, in Unterwiesacker the horse-gear is, by contrast, over-represented. The unscrupulous excavators may have divided up the finds from Niederhofen and fabricated the Unterwiesacker excavation. Whereas this throws doubt on the validity of the Unterwiesacker grave ensembles, it raises the possibility that our putative wagon-box ornaments may have come from graves with wheel fittings.

14) *Schöngeising, 'Büchelwiese', tumulus 5 (Kreis Fürstentfeldbruck, Oberbayern)*: This tumulus contained pieces of wood covered with bronze nails, triangular plaques of bronze, and bronze sheet. The tumulus also contained an iron ring, some bronze knobs and probably a ring-footed rein-knob. The finds are now lost (Kossack 1959, 200). Whether the wooden object was part of a wagon or some other grave furnishing cannot be decided.

15) *Ortlfing tumulus 8 (Kreis Neuburg-Schrobenhausen, Oberbayern)*: Apart from pottery vessels and two bronze ring-footed knobs this grave contained pieces of wood bearing small bronze nails with triangular heads (Kossack 1959, 176). Perhaps these pieces of wood should be compared with those from Neu Esting and Moritzbrunn, with similar nailed decoration.

16) *Fürstentfeldbruck (Kreis Fürstentfeldbruck, Oberbayern)*: Apart from an iron sword and remnants of horse-gear this grave contained six openwork bronze plaques (Kossack 1959, 198). The plaques have a hole in each upper corner which held iron rings – presumably their means of attachment (Fig. 74, 36–7). These cannot be regarded as typical *Jochschnallen*, and a decorative rôle on a wagon is not improbable.

17) *Albstadt-Ebingen, 'im Rauenwiesle' (Zollernalbkreis, Reg.-Bez. Tübingen)*: This tumulus had been badly damaged by Alemannic graves (Breeg 1938, 409–10; Zürn 1987, 213, cat. no. B2, Best. 2). The excavators found a 'blanket' of leather covered with decorative bronze nails with triangular heads, a bone disc, some remnants of bronze sheet, some bronze knobs and rings. The finds are now lost but they are shown on a photograph in the Ebingen museum. The 'bronze knobs' appear to be rein-knobs, and furthermore it is possible to recognise a rein-guide ring similar to that from Maisach-Gernlinden (Kossack 1959, pl. 60, 8). While there is certainly a component of horse-gear in this grave, it is less certain whether the decorated leather 'blanket' should be regarded as a yoke. The nails with triangular heads have parallels in Moritzbrunn and Neu Esting, which could suggest that they were used to decorate a wagon.

It is difficult to reach a satisfactory conclusion about the 17 graves listed above, particularly owing to the paucity of modern excavations. Perhaps the publication of the Mitterkirchen wagon will allow a deeper understanding of the wagon-boxes of type ii. The most important result of our discussion is the conclusion that the ornaments of type ii (Fig. 74) neither belong to the yoke nor to the harness; they decorated another wooden grave furnishing. In four graves this was very probably a wagon (Mitterkirchen, Gaisheim, Hossingen, Neu Esting). In the other 13 graves it was also not unlikely that the ornaments decorated a wagon or wagon-box. However, it is curious that only five of the graves contained wheel fittings. Perhaps the wagons with decoration of type ii constituted a special tradition of wagon construction in which the wheels were made completely of wood. Conversely we could postulate a burial rite involving the burial of the wagon-box without the undercarriage, a practice known from the early Middle Ages (Müller-Wille 1985).

If the wagons represent a discrete tradition of construction and decoration it would be tempting to compare them with the wagon fittings of the Bad Homburg group (box type i). The nailed rings (Fig. 74, 14–15) and bosses (Fig. 74, 12–13), for example, were probably used together and doubtless had a decorative effect like the bipartite discs from Bad Homburg (Figs 37, 1–2; 38, 4–9) or Wehringen (Pl. 96, 11–14). Furthermore it should be recalled that the Wehringen wagon, like the examples from Mitterkirchen, Gaisheim, Hossingen and Neu Esting, also seems to have had an elaborately decorated wooden construction at the rear end of the box. Perhaps the lack of iron tyres on wagons with type ii boxes could be interpreted as a continuation of late Urnfield customs. The nave fittings from Beratzhausen and Lengenfeld

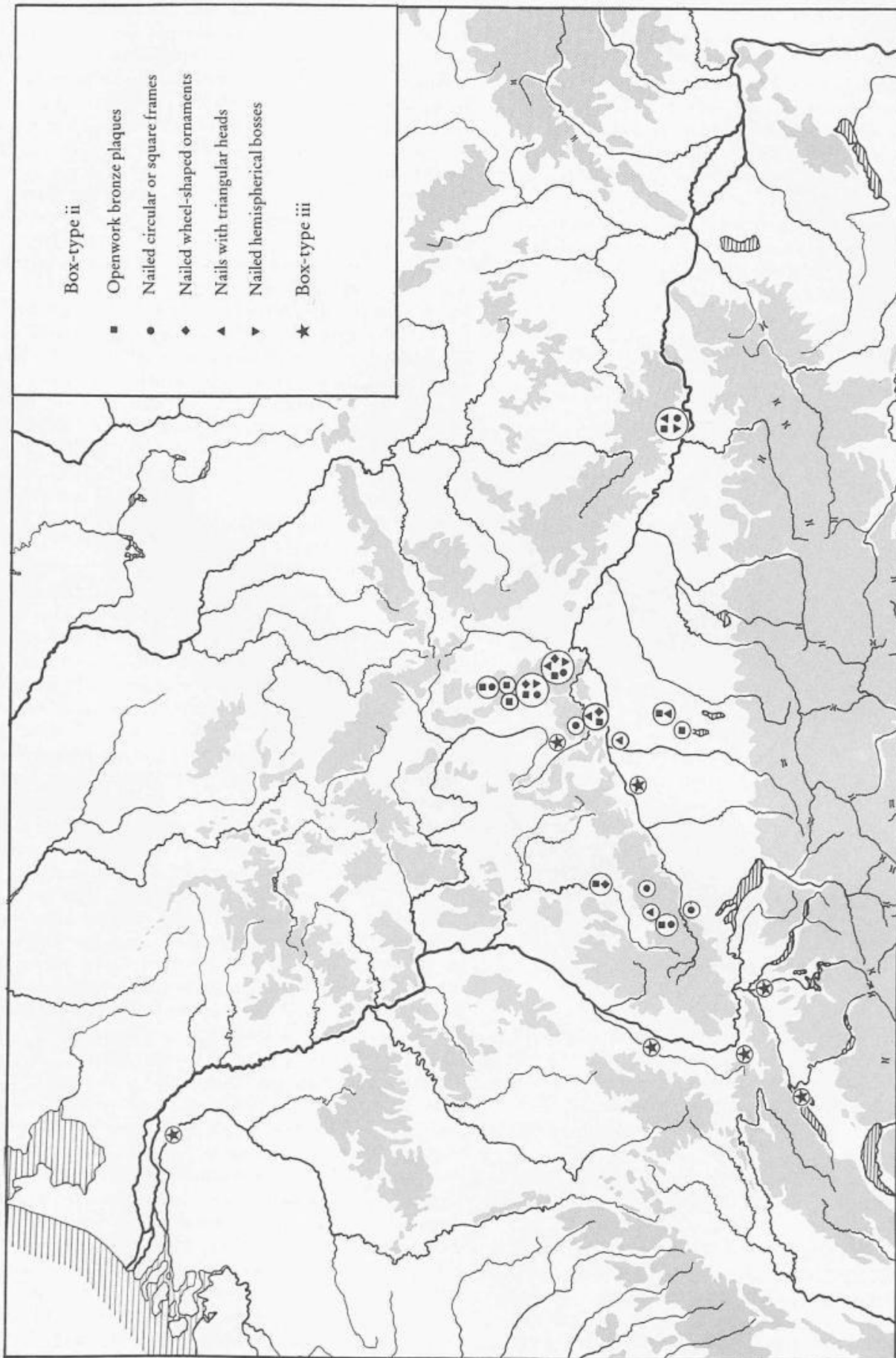


Fig. 75 The distribution of wagon-box ornaments of types ii and iii.

('type Lengenfeld') are also curious, being quite unlike the other Ha C naves and possibly suggest a wooden nave construction with a wide outer flange, similar in shape to the Wehringen type. Even though it is tempting to postulate the existence in Ha C of a conservative (type ii box, rare use of tyres, naves of type Lengenfeld) alongside an innovative tradition of wagon construction (elaborate iron wheel fittings including naves of type Breitenbronn and tyres of type I), our poor understanding of the type ii wagon-boxes urges considerable caution.

The fittings of type ii have an interesting distribution with two main concentrations: on the Swabian Alb and in Bavaria (Fig. 75). Mitterkirchen, further down the Danube, forms an outlier to the east.

7.3 WAGON-BOX FITTINGS OF TYPE iii

Taken alone, the grave finds described above do not form an entirely convincing group of wagons. It is particularly difficult to accept that openwork bronze plaques could be used as rattling pendent ornaments on wagons, because their closest parallels (*Jochschnallen*) are otherwise known only as fittings on yokes. It is therefore very welcome to find analogous openwork plaques among the bronze fittings from the lower grave of Ins tumulus VI (Pl. 25). The Ins grave contained a wagon with a richly decorated box, covered with bronze sheet plaques with openwork decoration. Among the plaques it is important to note some which clearly resemble *Jochschnallen*, with hemispherical bosses and openwork lozenge-shaped decoration (Pl. 25, 5-6.11). Their resemblance to the openwork bronze plaques on the wagons described above extends to the way in which they were affixed to the box with loops of iron wire (Pl. 25, 5.11).

The Ins wagon is the best preserved representative of the third type of box decoration. Although the decoration is related to *Jochschnallen* and to the plaques found on the wagon-boxes of type ii, the decorative plaques are now of a different, more developed character. On the Ins wagon there was a multitude of different types of ornament, only some of which resembled *Jochschnallen*.

A few fragments of similar plaques were found in the robbed wagon-grave from Blotzheim (Pl. 8B, 10). The plaques seem to have had a double row of bosses and openwork circles and squares. The grave also contained one wheel-shaped ornament with a central nail, which could be related to the wheel-shaped ornaments from Beratzhausen, Lengenfeld, Köngen and Moritzbrunn (Pl. 8B, 14).

On a further series of wagons the box decoration seems even more distantly related to *Jochschnallen*, although retaining openwork decoration or bosses. The best preserved plaques come from Ohnenheim, where three varieties are represented (1: Pl. 11, 1; 2: Pl. 11, 2.7-9; 3: Pl. 11, 3-6). These were of cast bronze with hollow cups and openwork lozenge and triangle decoration. The plaques always had small rectangular tongues which fitted either into the holes of the angle-sockets (Pl. 14, 3.6.8-9) or into

the top and bottom of the wooden sides of the box. A related set of box fittings comes from the grave of Birnenstorf, where the decorative plaques are composed exclusively of bosses (Pl. 24B, 4-5). The plaques from Aislingen, 'Oberes Ried', tumulus 1 again have hollow bosses and triangular openwork decoration (Pl. 56A, 1-2). One fragment has remains of a hollow iron tube, as seen on some of the fragments from Ins (Pl. 25, 1.7). The plaques from Dittenheim are similar in form to the Aislingen examples, although now they are made of bronze and iron in an elaborate composite technique (Pl. 68B).

The surviving decorative plaque from the Wijchen wagon-box was badly damaged by the cremation pyre and it even seems to have been 'folded up' before burial (Pl. 5, 1). Like the plaques from Ohnenheim and Birnenstorf, the bronze strip from Wijchen had small projecting tongues. It was decorated with circles and triangles in openwork technique. The finds from the Wijchen grave also included fragments of cast bronze plaques made from hemispherical cups (smaller: Pl. 5, 3.10; larger: Pl. 5, 11). These could also have decorated the Wijchen wagon-box, as could the nailed bronze rings and nails with domed heads (Pl. 5, 5-8).

Four of the graves with wagon-box decoration of the third type have socketed terminals which may represent another characteristic of the wagon type. Those from Wijchen (Pl. 5, 2.4), Birnenstorf (Pl. 24B, 1) and perhaps Ins (Drack 1958a, 36, fig. 36, 7-8) are rather similar, with a four-sided base and bulbous head. The Ohnenheim wagon, however, had quite different terminals, with 'T'-shaped heads and sockets which were pentagonal in cross-section (Pl. 14, 1-2).

The angle-sockets which formed the top railing of the wagon-boxes from Birnenstorf and Ohnenheim are an important feature of this wagon type. The small projections on the decorative plaque from Wijchen show that a similar box construction was used on that wagon (Pl. 5, 1). The sockets from Birnenstorf and Ohnenheim are members of a series of angle-sockets with a wide distribution. The only other typical example which may have come from north of the Alps is the isolated piece in the Eisenstadt museum probably from 'Austria-Hungary' (Pl. 127C), which again has the typical holes on one side. Further possible candidates are the sockets from Pullach, 'Gruppe Süd', tumulus 3 which, however, lack the holes which are characteristic of the group (Pl. 87B), and the singular socket from Ins (Drack 1958a, 37, fig. 37, 37).

M. Egg recently published the pair of angle-sockets from the princely grave of Gornja Radgona (Radkersburg) in Slovenia (Egg 1986a, 201, fig. 2, 4). Based on his important research on the Ohnenheim angle-sockets Dr Egg concluded that the Gornja Radgona pieces came from a wagon-box, and he was able to collect a series of comparanda from South Tyrol, the Golasecca culture and Etruria (Fig. 76). Owing to the relatively early chronological position of some of the Italian examples (Como-Ca' Morta 'Tomba con Carettino'; Praeneste 'Tomba Bernardini'), dating to the first half of the 7th century, Dr Egg concluded that the angle-sockets north of the Alps

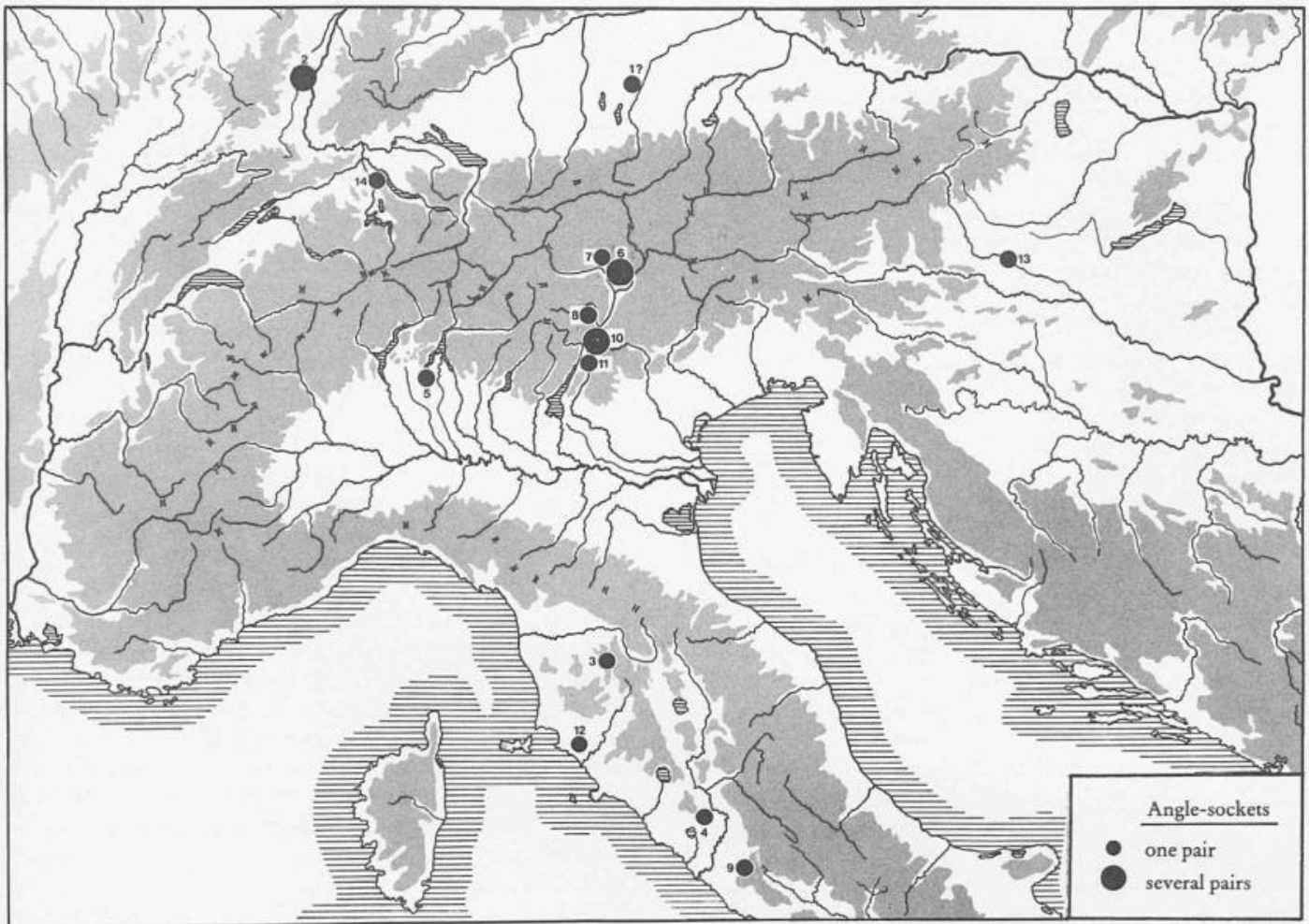


Fig. 76 The distribution of angle-sockets: 1 Pullach; 2 Ohnenheim; 3 Castellina in Chianti; 4 Civit  Castellana; 5 Como-Ca' Morta; 6 Flaas (Valas); 7 Jenesien (S. Genesio); 8 Mechel (Meclo); 9 Palestrina; 10 Pfatten (Vadena); 11 Trento; 12 Vetulonia; 13 Gornja Radgona (Radkersburg); 14 Birnenstorf. – After Egg 1986a.

represented technological influence from Etruscan Italy (ibid. 1986a, 210–11).

The novel wagon-box construction with angle-sockets was adopted on some wagons with type iii box decoration. But it need hardly be stressed that the openwork plaques of the type iii wagon-boxes formed part of a local north Alpine tradition, developing from the type ii box ornaments and probably ultimately rooted in the Bad Homburg group of wagon fittings (box type i).

The box fittings of type iii are distributed north and north-west of the Alps, with one outlier on the lower Rhine at Wijchen (Fig. 75).

7.4 WAGON-BOX FITTINGS OF TYPE iv

The fourth type of wagon-box is characterised by its scant decoration and limited range of fittings. Three grave finds give some information on how the fittings were used. The plan of Hohmichele, grave VI (Fig. 165) shows the use at the rear end of the box of a pair of disc-headed sockets (Pl. 27B, 4–5) and a pair of ribbed half-cylinders (Pl. 27B,

6–7); in this case the disc-headed sockets seem to have been positioned a little to the inside of the half-cylinders, which may mark the rear corners of the box. In Hradenín grave 28 there are similar sockets (Pl. 111A, 4–5) which now seem to be associated with heavily profiled spools instead of half-cylinders (Pl. 111A, 1). The profiled spool by the north-west wheel perhaps marked the rear corner of the box; the disc-headed socket was positioned a little to the inside, as in Hohmichele grave VI (Fig. 207). By the north-east wheel the fittings do not seem to be in their original position.

On both wagons these bronze fittings were clearly applied to the rear end of the box and it is possible that the half-cylinders, sockets and spools functioned together in some way. A little more information about the use of the heavily profiled spools comes from Laiz (Pl. 50C). Two spools survived: the larger was held by a wooden dowel to a piece of wood which was covered by leather and decorated with nailed bronze rings and nails (Pl. 50C, 1–2). The smaller spool was held by a dowel between two pieces of wood (Pl. 50C, 4–5). The decorated piece of wood presumably came from the wagon-box and, to

judge by the Hohmichele and Hradenín graves, probably the rear end.

The function of the spools, disc-headed sockets and half-cylinders is unclear. Their form suggests that they could have been used to hold reins but, owing to their position, not the reins of the wagon's draught horses. It is also possible that the fittings were attached to a construction mounted on the rear end of the box, as on the wagon-box of type i from Wehringen and on the type ii boxes from Mitterkirchen, Gaisheim, Hossingen and Neu Esting.

These fittings are found in a further eight graves. In the grave from Vilsingen all three types of fitting were represented (Pl. 41A, 1-2.5.8-9). The top of the disc-headed socket was decorated with stamped dots-and-circles, in effect repeating the decoration of the wagon's axle-caps. The disc-headed sockets from Uffing tumulus 6 are also decorated, now cast with circles and excised triangles (Pl. 90C, 1) with parallels from Eggingen (Pl. 51D, 1) and Siedelberg, Upper Austria (Egg 1985b, 300, fig. 24, 1). In Mauenheim, tumulus N, grave 3 the wagon-box was adorned with the same rich nailed ring decoration known from Laiz (Pl. 40A, 2-3.6) and a disc-headed socket was also present. Laiz and Mauenheim N/3 suggest that decoration with nailed rings may have been particularly characteristic of the fourth type of wagon-box. Uffing tumulus 11, Hügelsheim and Hundersingen, 'Talhau', tumulus 3 also had nailed ring decoration and could indicate more wagon-boxes of this type (for Hundersingen, see Schiek 1956a, 65; pl. 25, 4; for the other graves, see catalogue). Finally, two more wagon-boxes may be added to the fourth type, owing to their disc-headed sockets: Waltenhausen (Pl. 94B, 5) and Mauenheim, tumulus M, grave 3 (Pl. 39B, 1-2).

The nailed ring ornaments noted on some of these wagons continue a tradition noted on the wagon-boxes of type iii (Wijchen, Pl. 5, 5-8), type ii (Mitterkirchen, Fig. 73, 1; Hossingen, Pl. 46A, 6; Beratzhausen, Fig. 74, 12-15; Lengenfeld; Oberstetten, Pl. 37E, 7), and possibly reaching back to the late Urnfield and early Hallstatt box decoration of type i (the bipartite discs with nailed rims of the Bad Homburg group, e.g. Fig. 37, 1-2; Pl. 96, 11-14).

The distribution of the box ornaments of type iv (Fig. 77) shows a marked concentration on the upper Danube with outliers on the upper Rhine (Hügelsheim), in Bavaria (Uffing), Austria (Siedelberg) and Bohemia (Hradenín). Certainly the two graves furthest to the east represent western influence. In the case of Siedelberg, this agrees well with the marked western influence in this cemetery and in neighbouring Utterdorf, noted by M. Egg (1985a; 1985b). The Hradenín box ornaments are unique in Bohemia and demonstrate the same western influence noted for the naves from Hradenín grave 28 and the naves and tyres from Nymburk.

7.5 WAGON-BOX FITTINGS OF TYPE v

The best known wagon-boxes of the fifth type are those covered with decorated iron or bronze sheet from Bad

Cannstatt, Hochdorf and the Býčí-skála cave. Two more wagons, from Ludwigsburg and Apremont grave 2, may also have had elaborate metallic box decoration. The decorative metal sheet from Hochdorf, Býčí-skála and Bad Cannstatt shows the sides of the wagon-box to have been, respectively, 85, 110 and 143 mm high. In each case, the sides of the box were divided into horizontal decorative zones. The sides of the boxes from Bad Cannstatt and Hochdorf had similar cross-sections, forming five horizontal fields, two of which were recessed (Pl. 48, 5; Fig. 93; Biel 1985b, 145, fig. 79). The sides of the Bad Cannstatt box were covered with bronze sheet with embossed anthropomorphic and zoomorphic motifs, the Hochdorf sides were covered with iron sheet with engraved linear decoration. The Býčí-skála box is even more elaborately decorated, with a central inset field (Pl. 105, 8, C-E) and two outer fields (Pl. 105, 8, B-F). The top of the sides was decorated with a row of raised bosses (Pls 105, 8, A; 106, 1-2), as was the lowest decorative field (Pls 105, 8, F; 106, 6). The uppermost field (Pl. 105, 8, B) had a row of embossed birds, and the central field had arrangements of swastikas, 'H'-shaped motifs and dot-and-circle motifs (Pl. 106, 4-6). The iron sheet box decoration from Apremont grave 2 is less well preserved (Pl. 8A, 4.6.8-9), but could be related to the bronze sheet from Býčí-skála, judging from the beaded ribs on the metal sheet of both wagons. It is impossible to say whether the Ludwigsburg box was related to those of the four wagons described above: the excavators reported that the box was covered with iron fittings, but these have not survived.

These wagons are related to a less richly decorated group. Thus the ribbed hemispherical bosses on the Hochdorf wagon-box (Fig. 93; Biel 1985a, 92, fig. 104) are also seen on the wagons from Starnberg-Mühlthal (Pl. 89B, 2-4.6), Augsburg-Wellenburg (Pl. 60A, 17-20), Sainte-Colombe, 'La Butte' (Pl. 16, 12), and possibly also Donauwörth (Pl. 70B, 9) and Allenlűften (Jahn 1870, pl. 3, 11). The Wellenburg wagon also has a number of iron bands decorated with triple longitudinal ribs, combined with curved iron sheet (Pl. 60A, 3-9.11), paralleled at Apremont in grave 2 (Pls 7, 8-9; 8A, 2-3.5.7), Allenlűften (Jahn 1870, pl. 3, 7-8), and Utterdorf tumulus 5 (Pl. 130A, 7). Although the exact function of these iron sheet fittings is uncertain, it is most likely that they belonged to the wagon-box.

Four further wagons had hemispherical bosses on their box corners: Apremont grave 1 (Pl. 6B, 5) and grave 2 (Pl. 8A, 1), Bad Cannstatt (Pl. 48, 2-4) and Býčí-skála (Pl. 105, 9).

The Hochdorf wagon had a long iron half-cylinder at its rear end which fitted to a wooden object, possibly part of the box (Biel 1985b, pl. 44). A similar fitting from Apremont grave 1 may have had the same function as the Hochdorf half-cylinder (Pl. 6B, 2). Indeed, both fittings may be related to the short half-cylinders on the rear ends of type iv wagon-boxes, discussed above. Short half-cylinders have, in fact, been found in two graves with Bad Cannstatt naves: Sainte-Colombe, 'La Butte' (Pl. 16, 1) and Meßkirch-Langenhart (Pl. 43B, 4-5). Although half-

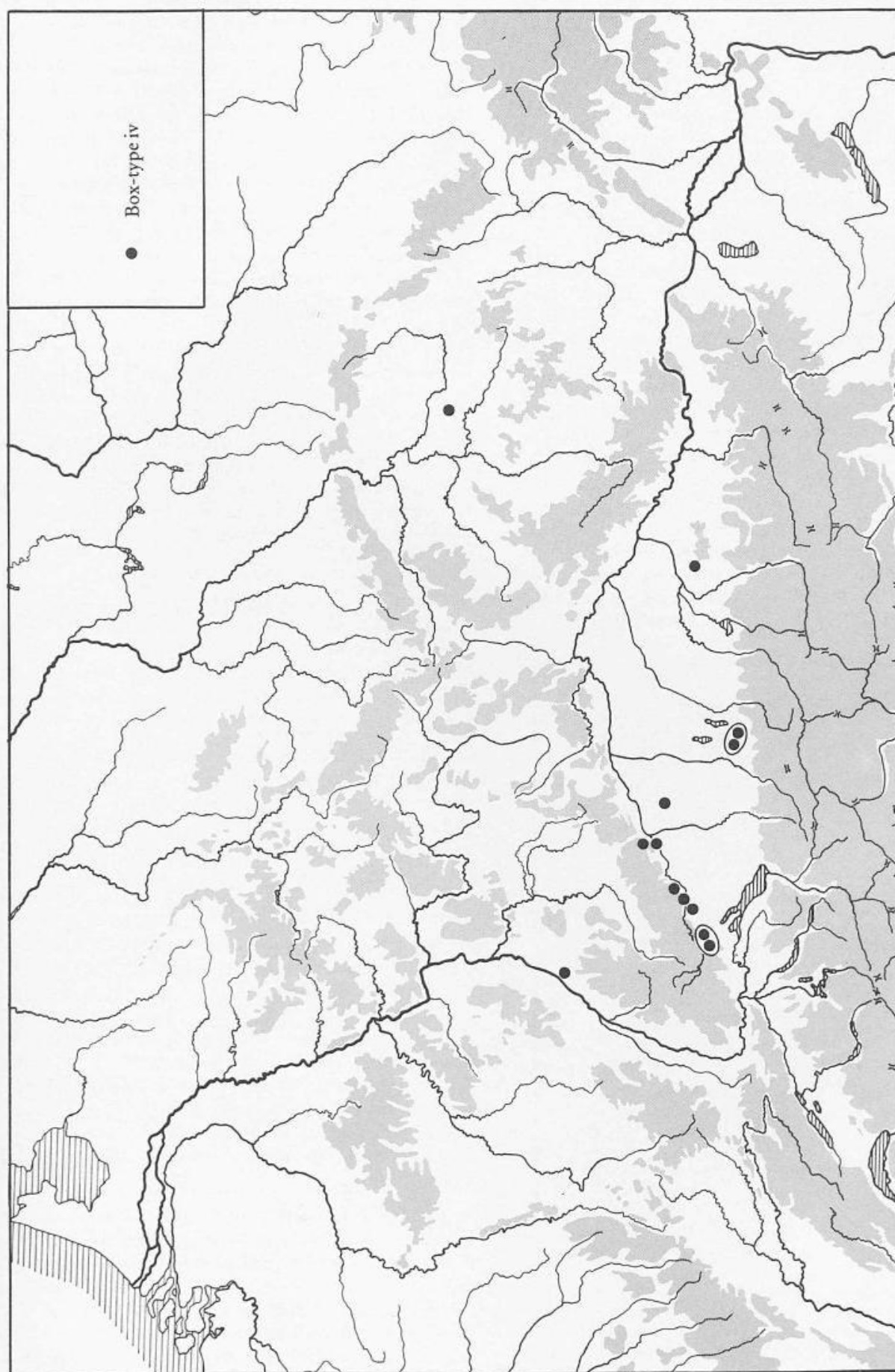


Fig. 77 The distribution of wagon-box decoration of type iv.

cylinders are documented on the boxes of seven different wagons, their function remains unclear; it only seems certain that they were fitted to the rear end of the wagon and probably to the wagon-box. Finally, the fragments of iron sheet bearing large hollow bosses from Sainte-Colombe, 'La Butte' should be mentioned (Pl. 16, 3.5). Owing to their size it is probable that they were fitted to the wagon-box. This type of decoration remains unique.

7.6 WAGON-BOX FITTINGS OF TYPE vi

The last type of wagon-box decoration can be recognised in perhaps six graves. The best documented is Bell, where each corner of the wagon-box had an iron rod with a decorative cast bronze head (Fig. 78, 1). Otherwise, the box only had a few decorative nails. Very similar rods with bronze heads are found in the graves from Hennweiler and Hatten, and these must also have been fitted to the corners of the wagon-boxes (Fig. 78, 2; Pl. 10D). The rods from Oberleinach have iron heads, but have a similar bulbous shape and everted flanges best paralleled on the examples from Hatten (Pl. 78, 2-4). A pair of related terminals with bronze heads was also found in Asperg, 'Grafenbühl' (Pl. 30, 3-4). Whether the Oberleinach and Asperg wagon-boxes were decorated with their rods is uncertain, but because of their resemblance to the pieces from Hatten, Bell and Hennweiler, it seems probable.

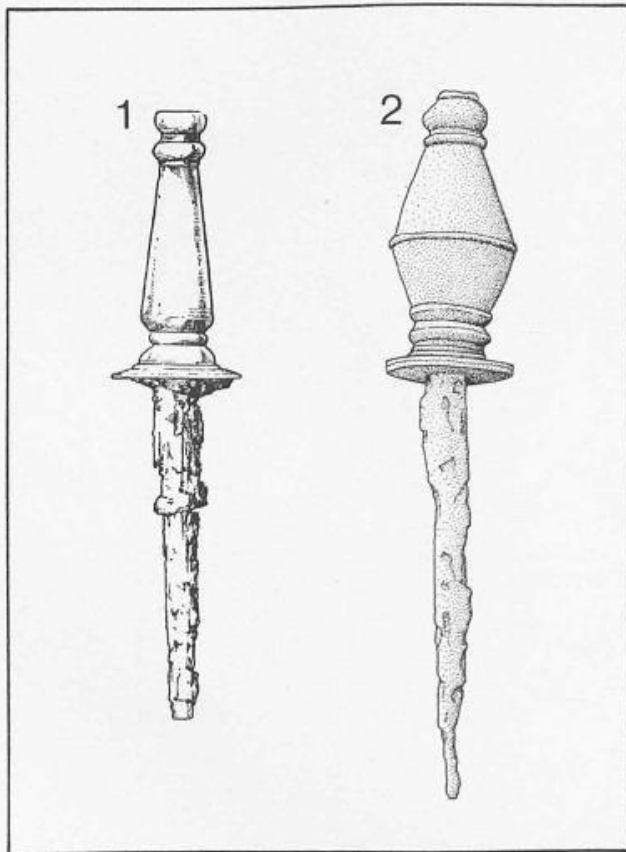


Fig. 78 Iron rods with decorative bronze heads: 1 from Bell; 2 from Hennweiler (1 after Rest 1948; 2 after Driehaus 1966a). - Scale 1:2.

However, the Asperg pair of terminals was found *in situ* on the grave floor, and they seem to be spatially related to two groups of wood, bone and bronze fittings (Zürn 1970, pl. 21). The finds formed a square measuring 400 x 400 mm, and Zürn interpreted them as the remains of a chair. But the fittings were located in the eastern half of the grave in the same area as the remains of the wagon. It seems unlikely that the two groups of bone, wood and bronze fittings could have belonged to the wagon and it is suggested that they may instead have come from a different item of the grave goods and need not have had any connection with the bronze terminals.

Finally, the iron rods from Sainte-Colombe, 'La Garenne', and the iron rods with bronze heads from Vix require comment. The pieces from Vix (Pl. 23, 3) certainly did not adorn the wagon-box and seem to have functioned on the wagon pole. The five fragmentary rods from Sainte-Colombe (Pl. 18, 11-16), on the other hand, very likely decorated the sides of the wagon-box, as newly excavated parallels from Diarville demonstrate (see Addenda). The wagon fittings from La Garenne also include 24 nails with decorative heads which underline a relationship with the wagon from Bell (compare Pl. 18, 6-10 with Rest 1948, 140, fig. 5, 1).

7.7 MISCELLANEOUS WAGON-BOX FITTINGS

Only five or six wagons have box decoration which cannot be accommodated in the six types described above:

1) *Scheßlitz-Demmelsdorf* (cat. no. 137): This recently excavated wagon-grave contained numerous fragments of bronze sheet with embossed circles and anthropomorphic and zoomorphic motifs (Pl. 88A, 6). The excavator, B.-U. Abels, suggested that the bronze sheet decorated the wagon-box. Indeed, the bronze sheet was certainly attached to wood, as the bronze nails up to 10 mm long show. Abels also found two pieces of wood with negative impressions of the embossed decoration - they could represent remnants of the wagon-box (Pl. 88A, 7-8). The decoration is similar to that on the wagon from Bad Cannstatt, but the Demmelsdorf box did not have a profiled cross-section with inset decorative fields. The embossed circles in the lower horizontal field (Pl. 88A, 6) bear a resemblance to the circles on the embossed iron sheet fragments from Apremont grave 2 (Pl. 8A, 4.6.8-9). Owing to its parallels from Bad Cannstatt and Apremont, the Demmelsdorf box should perhaps be allied to the type v box fittings.

2) *Kitzingen-Repperndorf* (cat. no. 123): The box of this wagon was decorated with strips of bronze sheet arranged in zig-zag and grid-shaped patterns (Figs 191-2). Eight different arrangements of bronze strips could be detected (Pl. 81, 13.22-6.29-30). According to the position of the finds, the grid-shaped decoration was applied to the lower level of the box and the zig-zag decoration to the upper level, as can be seen on L. Wamser's reconstruction

(Wamser 1981a, 252, fig. 20). The Repperndorf box is unique (the bronze strips from Beratzhausen grave 3 and Lengenfeld were applied to a curved object and are not closely related to the Repperndorf examples).

3) *Vix (cat. no. 17)*: The richly decorated fittings from the Vix wagon-box are quite unique north of the Alps (Fig. 162). The long sides of the box were each provided with seven hollow cast balusters and seven cast plaques with wheel-shaped openwork decoration (Pl. 23, 11–12.14–15). They probably fitted between wooden timbers which formed the top and bottom of the box sides. The plaques were held in position by their rectangular flanges and the balusters by iron rods which passed through the hollow bronze tube. The south end of the box seems to have been framed by three bronze sheet fittings, apparently indicating that it was 135 mm high and 600 mm wide. It was decorated with three sheet bronze rosettes (Pl. 23, 1.2.4.5) and numerous bronze nails and nailed bronze rings (Pl. 23, 6–10). The two upper corners of the frame each had a hole and Joffroy thought that the decorative balusters were positioned above this, making the total height of the sides about 270 mm. However it is also possible, and indeed more likely, that the balustrade ran below the top of the frame, requiring sides only 135 mm high.

The north end of the box was provided with three plaques with wheel-shaped openwork decoration (Pl. 23, 16). Joffroy thought that two pieces of decorated bronze sheet, 372 mm long, were also applied to this end of the box, but it now seems more likely that they belonged to the personal goods of the inhumation. Also near the north end of the box were two pairs of bronze phalerae with concentric ribs, a larger pair and a smaller pair. According to Joffroy, these were fitted to a wooden background, but this seems unlikely in view of the short rivet illustrated on one of the phalerae. The end of the rivet bore traces of fur and it appears more probable that the phalerae were attached to leather, and could be from a cloth or leather cover for the wagon.

The fittings from Vix could have been mounted on a box 135 mm high and 600 mm wide, corresponding to the dimensions documented by the richly decorated wagon-

boxes of type v. For a reconstruction and description of the Vix wagon, see Egg and France-Lanord 1987.

4) *Como-Ca' Morta grave of 1928*: The elaborate box construction of this wagon was extremely complex, making a description very difficult in the absence of a detailed study. An impression of the quantity and elaborateness of the bronze fittings can be gained from Ghislanzoni's illustrations (e.g. Fig. 3). Like Vix, the sides of the box had hollow bronze balusters held in place by iron rods (Pl. 134, 12). Unlike Vix, Ca' Morta also had a series of larger balusters which could have supported the box above the level of the wheels (Pl. 134, 7–10). A large quantity of bronze sheet with embossed lines, dots and circles seems to have covered the whole surface of the wagon, including the sides of the wagon-box. A detailed study of the bronze remains may one day allow a partial reconstruction of the wagon-box, but at present its original appearance is unknown.

5) *Villingen-Schwenningen, 'Magdalenenberg' (cat. no. 96)*: It may be that wooden components like those from the Magdalenenberg were used on other wagons, but have only survived here owing to the exceptional preservation of organic material in this waterlogged grave. The finds include 13 oak rods, 115–145 mm in length, which could have acted as balusters on the wagon-box (Spindler 1971, pl. 8, 1–13). A large piece of ash wood, 495 mm long, had a rectangular socket at each end as well as a pair of holes which may have accommodated decorative objects (ibid., pl. 9, 5). Its function is uncertain, but it may have been mounted on one of the ends of the wagon-box. The grave contained many other pieces of worked wood, some covered with leather, which could likewise have belonged to the box, although none is characteristic enough for its function to be known.

6) *Praha-Bubeneč grave 3 of 1907 (cat. no. 164)*: An iron fitting from this grave may have been mounted on one of the sides of the wagon-box (Pl. 124A, 1). It was 140 mm long, had a 'U'-shaped cross-section and was provided with three long iron nails with spherical heads. It may be comparable to the fragmentary iron fittings from Apremont grave 2 (Pl. 7, 9) and Augsburg-Wellenburg (Pl. 60A, 3.5.7.11).

The Hallstatt Wagon: typological conclusions and the definition of wagon types

This chapter concludes our classification of the 228 wagons of the Hallstatt period from Central Europe (Fig. 4). The first two sections are concerned with the various wagon components. It is argued that wagon types can be recognised, *which are defined as recurrent associations of wagon fittings*. The analysis of these associations results in a combination table (Fig. 85), which is summarised in the diagram on Fig. 86. After describing the seven wagon types, the following section deals with wagons without iron tyres and with very few other metal fittings. The fourth section discusses graves which only contained Bohemian linchpins, which presumably represent the *pars pro toto* deposition of a wagon. Finally, section 5 contains a table summarising the typological classification of the wagons of the Hallstatt period.

8.1 THE COMBINATIONS OF FITTINGS ON WAGONS

Chapters 4–7 have involved the description and typological analysis of all the metallic fittings used on wagons of the Hallstatt period. It has been possible to recognise at least 18 varieties of nave, seven types of tyres and tyre nails, six types of box decoration and various types of felloe-clamps, spoke fittings, axle-caps and linchpins. Furthermore, three types of felloe construction could be demonstrated.

In this chapter it is the combinations of fittings used on wagons which will be discussed. The data are illustrated in a series of six tables, showing the combinations of tyres and tyre nails (Fig. 79), tyres and felloes (Fig. 80), naves and tyres (Fig. 81), naves and felloes (Fig. 82), naves and spoke fittings, axle-caps and linchpins (Fig. 83) and naves and box fittings (Fig. 84).

1) *Tyres and tyre nails*: On 99 wagons both the nail and tyre types of the wheels can be recognised; these 99 combinations are shown on Fig. 79. As explained in Ch. 4, our typological definition entails that tyres of type I are characterised by type A nails, and type V tyres by nails of type C. The table also shows that the nails with large square or round heads of types D, E or F are only found on the wide flat tyres of types VI and VII (with two exceptions from Switzerland, Chabrey and Ins tumulus VI of 1848, lower grave, where type D nails were used on tyres with a cross-section of type II). Furthermore, type III and IV tyres, with domed cross-sections, typically have countersunk nail heads. The one exception to this

rule comes from Gottesberg tumulus 3 where the tyres have small subrectangular nail heads which, however, only project slightly above the surface of the tyre. Nails with countersunk heads were not restricted to tyres of types III and IV: they could be used on every type of tyre (including most of the miscellaneous tyres), with the obvious exception of types I and V which are characterised by closely-spaced large-headed nails.

2) *Tyres and felloes*: We have information about both tyres and felloes from 83 wagons (Fig. 80). The combination table shows a clear division: double felloes (Großeibstadt or Bruck constructions) are only found on tyres of types I, II and III; type IV, V, VI and VII tyres were only used with bent felloes, probably always with the Gottesberg construction (the only exception is on the Reichenau wagon, with Großeibstadt felloes and tyres of type IV).

3) *Naves and tyres*: Both tyres and nave fittings survive from 81 wagons, showing an important pattern of combinations (Fig. 81). The table shows five main groups of combinations: 1) wagons with naves of type Wehringen never had iron tyres; 2) the naves of types 3–6 (type Breitenbronn and related naves; type Ins) were only used on wagons with tyres of types I, II, III and IV; 3) wagons with conical naves (types Erkenbrechtsweiler, Emerkingen, Winterlingen, Vilsingen etc.) are particularly characterised by tyres of type V, although tyres of type III could also be used; 4) tyres of type VII were never used on wagons with the above-mentioned naves; 5) tyres of type VI were only used on wagons with naves of type Grandvillars or naves with simple iron caps. It is important to emphasise that these groups correspond to broad groupings within the nave typology. Thus the naves of types 3–7 are all related to the Breitenbronn type, either by their profiled nave-caps (type Ins; Harburg-Marbach), their nave-head rings ('naves with nave-head rings but no caps') or their nave-neck sheathings ('naves with nave-stock rings and nave-neck sheathings'). The naves of types 8–12 are all conical in shape and their necks are typically covered with bronze sheet. The naves of types 13–18 are particularly characterised by cylindrical nave-heads. The naves of type Grandvillars and the naves with simple iron caps seem to be related typologically to each other, and their distinctiveness is underlined by their use on wagons with tyres of type VI.

4) *Naves and felloes*: We know both the felloe construction and the nave type of 68 wagons (Fig. 82). There is a clear

	I	II	III	IV	V	VI	VII
A							
B							
C							
D							
E							
F							
D-F							
G							

Fig. 79 Table showing the combinations of tyres (types I-VII) and tyre nails (types A-G) on wheels of the Early Iron Age.

	Großfibstadt	Bruck	Großfibstadt or Bruck (double)	Bruck or Gottesberg	Gottesberg
I					
II					
III					
IV					
V					
VI					
VII					44

Fig. 80 Table showing the combinations of tyres (types I-VII) and felloe constructions on wheels of the Early Iron Age.

	I	II	III	IV	V	VI	VII
Wehringen							
Lengenfeld	•						
Breitenbronn	•••○	•••••••	•••••	•			
Nave-head rings but no caps	•			•			
Nave-stock rings and nave-neck sheathing	•			○			
Ins	○	••	○				
Harburg-Marbach	•						
Erkenbrechtsweiler			••		•••••○		
Emerkingen							
Winterlingen			•		○		
Vilsingen					•••		
Other conical naves					••		
Hohmichele VI and Uttendorf 2							••
Repperndorf							••••
Grandvillars						••••	•
Simple iron nave-caps						•••○	••○
Kicklingen							••○
Cannstatt		•					•••••••••• •••••••••• •○

Fig. 81 Table showing the use of the different nave and tyre types (I-VII) on wheels of the Early Iron Age.

division between wagons with double felloes (Großeibstadt or Bruck construction), which were particularly often fitted with naves related to the Breitenbronn type, and wagons which were probably always made with Gottesberg felloes, fitted with naves of types 8-18.

5) *Naves and spoke fittings, axle-caps and linchpins*: A more complicated picture is given by the combinations of nave

types with spoke fittings, axle-caps and linchpins (Fig. 83). Crescent-headed linchpins were used with naves with cylindrical heads. Wagons with Cannstatt naves were provided with a distinctive set of fittings not used on other wagons: ribbed spoke sleeves, type Wellenburg axle-caps and small-headed linchpins. Large-headed linchpins, in contrast, are only found on wagons with naves of types 2-12. However, the wheels with conical naves (types

	Großelbstadt	Bruck	Großelbstadt or Bruck (double)	Bruck or Gottesberg	Gottesberg
Wehringen					
Lengenfeld	●○				
Breitenbronn	●●●●●●●●●○	●○○○	●		●●
Nave-head rings but no caps	●			●	●
Nave-stock rings and nave-neck sheathings	●●○				
Ins	○○			●	
Harburg-Marbach	●				
Erkenbrechtsweiler				●○	●
Emerkingen					
Winterlingen					○
Vilsingen				●	
Other conical naves					
Hohmichele VI and Uttendorf 2					●●
Repperndorf				●	●●●●
Grandvillars					●●○
Simple iron nave-caps					●●○○
Kicklingen					●●○
Cannstatt					●●●●●●●●●●

Fig. 82 Table showing the use of the different nave types and felloe constructions on wheels of the Early Iron Age.

8-12) had their own characteristic fittings, particularly axle-caps of type Wijchen and spokes whose whole length was covered with undecorated bronze sheet. Although the combinations of the naves, axle-caps, spoke sleeves and linchpins present a complex picture it remains true, for the vast majority of cases, that a given nave type was only ever associated with one type of axle-cap, spoke-sleeve or linchpin. Therefore, in the case of four wagon-graves in

which nave fittings had not survived, but instead spoke fittings or axle-caps were preserved, it was possible to suggest the type of nave fittings which were probably originally used on the wagons' wheels (Hundersingen, tumulus 1, secondary grave 1, and tumulus 4, Oberstetten tumulus 2 and Wohlen).

6) *Naves and wagon-box fittings*: It remains to discuss the

	BRONZE SPOKE-SLEEVES		AXLE-CAPS			LINCHPINS					
	Smooth	Ribbed	Wichen	Domed	Wellenburg	Triangular	Double-axe	Bohemian	Trident	Crescent	Small
Wehringen											
Lengenfeld						★					
Breitenbronn								★			
Nave-head rings but no nave-caps											
Nave-stock ring and nave-neck sheathing							★				
Ins	★					★					
Harburg-Marbach											
Erkenbrechtsweiler	★							★			
Emeringen											
Winterlingen	★		★						★		
Vilsingen	★		★								(★)
Other conical naves											
Hohmichele VI and Uttendorf 2										★	
Repperndorf	★							(★)		★	
Grandvillars				★						★	
Simple iron nave-caps											
Kicklingen										★	
Canstatt		★			★						★

Fig. 83 Table showing the combinations of the various nave types with the various spoke fittings, axle-caps and linchpins on Early Iron Age wagons.

combination on wagons of naves and wagon-box fittings (Fig. 84). This combination table is particularly important because the naves and box ornaments show a remarkable correlation, forming six clear groups. Thus wagons with naves of type Wehringen were decorated with box fittings of type i. Wagons with type ii box decoration were either only provided with bronze nave-caps of type Lengenfeld or lacked nave fittings entirely. Wagons with type iii decoration were often fitted with type Ins naves. Wagons with conical naves had boxes decorated with ornaments of type iv. Box fittings of type v

were only used on wagons with Canstatt naves. Although the simple box fittings of type vi could be used on wagons with different types of naves, the naves probably belonged to a related family, always having cylindrical nave-heads. Another important grouping comprises wagons with naves related to type Breitenbronn (Breitenbronn naves, naves with nave-head rings but no caps, naves with nave-stock rings and nave-neck sheathings), which were never provided with metallic wagon-box fittings.















Wagon	Nave Type	Wagon - box type														
		i		ii			iii	ii-iv	iv			v				vi
																
Vénat	1	•														
Weinheim	1	•														
Bad Homburg	1	•	•													
Neuvy / B.	1	•	•													
145	1	•	•													
178 B	—			•	•	•		○								
107 B	2			•	•	•		•								
143	2			•	•	•		•								
129	—			•	•											
131	—			•												
81	—			•				•								
77	—			•	•			•								
3	—				•		•									
29B	6						•									
110	6						•									
12	6?						•									
99	—						•									
20	6/12						•									
1	—						•	•								
151 E	8								•	•						
89C	—							•		•						
144	8?								○							
141 C	8?							•								
141 B	8/10								•	○						
70 B	10?							•	•							
72	11								•	•	•					
68	11							•			•					
95	11?								•							
51 B	13								•		•					
70 A	14								•							
79 A	18										•					
13 A	18										•	•				
139	18											•				
111	18											○				
59	18										•	•				
103	18											•	•			
2 A	18										•			•		
176 B	18											•		•		
2 B	18											•		•		
90	18													•		
148	18													•		
52	18														•	
13 B	18														○	
38	15														•	
124	14														•	

Fig. 84 The combination of wagon-box and nave fittings on wagons of the late Urnfield and Hallstatt periods (nave types 1–18 refer to the section headings in Ch. 5).

Wagon fittings		1	i	2	ii	3	4	IV	5	I	II	6	iii	8	9	10	V	11	12	iv	14	15	VI	16	17	vi	VII	18	v
Wagon fittings	1	•	•	•	•																								
	i	•	•	•	•																								
	2			•	•					•																			
	ii			•	•					•																			
	3					•				•	•	•	•																
	4					•				•																			
	IV				•	•			•																				
	5					•			•																				
	I		•	•	•	•		•		•	•		•	•															
	II				•	•					•	•	•	•															•
	6									•	•	•	•	•	•														
	iii									•	•	•	•	•	•					•									
	8														•	•	•	•	•	•	•								
	9														•	•	•	•	•	•	•								
	10														•	•	•	•	•	•	•								
	V														•	•	•	•	•	•	•								
	11														•	•	•	•	•	•	•								
	12													•	•	•	•	•	•	•	•								
	iv													•	•	•	•	•	•	•	•								•
14																				•	•						•	•	
15																					•	•					•	•	
VI																				•	•						•	•	
16																					•	•					•	•	
17																						•	•				•	•	
vi																					•	•					•	•	
VII																					•	•					•	•	
18																						•	•				•	•	
v																													
Wagon types		1	2	3	2-4	3-4	4	5	6	6-7	7																		

Fig. 85 The combinations of tyres (types I–VII), naves (types I–18 refer to the section headings in Ch. 5) and wagon-box fittings (types i–vi) used on wagons of the Early Iron Age. Black circles: definite combinations; white circles: probable combinations.

8.2 WAGON TYPES

The most important results of our discussion of the combination tables (Figs 79–84) are illustrated on Fig. 85. This combination table summarises the combinations on wagons of the most important categories of fittings: six types of box fittings, six tyre types and the 15 main nave types. The table shows the existence of seven wagon types, which are defined as recurrent associations of wagon fittings (the typological scheme is summarised on Fig. 86). In all,

information could be used from 95 wagons from which finds survived documenting the combinations of either naves and box fittings, naves and tyres, tyres and box fittings, or naves, tyres and box fittings (the tyres of type III were used on wagons of three different types [types 3; 4; 5] and for the sake of clarity were not included on the table).

Out of a total of 228 wagons, 174 had either typical tyre, nave or box fittings which allow them to be classified

Wagon Type	Box	Naves	Tyres
1	i	Wehringen	0
2	a	Lengtenfeld	0.I
	b	No nave fittings	
3	a	Breitenbronn	I-IV
	b	Nave-head rings but no caps	
	c	Nave-stock rings and nave-neck sheathings	
4	iii	Ins	I-III
4/5	?	Harburg-Marbach	I
5	a	Erkenbrechtsweiler	III.V
	b	Emerkingen	
	c	Winterlingen	
	d	Vilsingen	V
		Other conical naves	
5/6		Hohmichele VI and Uttendorf 2	VII
6	a	Repperndorf	
	b	Grandvillars	
	c	Simple iron nave-caps	
	d	Kicklingen	
7	v. ?vi	Cannstatt	

Fig. 86 The typological classification of Hallstatt wagons, showing the use of the various tyres (types I-VII; 0 indicates wheels without iron tyres), wagon-box ornaments (types i-vi) and naves on wagons of types 1 to 7.

according to this typological scheme. Of the remaining 54 graves, four may be assigned to a late group characterised by meagre or non-existent iron fittings (the Bassenheim graves; Manětín-Hrádek), and a further 15 graves to a group characterised by the provision of Bohemian linchpins as *pars pro toto* of a wagon; these 19 graves are discussed later in this chapter. Only 35 wagons remain, which either had atypical fittings or, much more frequently, fittings which have not survived (cat. nos: 6; 7; 23; 29A; 29F; 30; 31; 33; 35; 54; 57A; 73; 84B; 85; 86; 93A; 93C; 94A; 94B; 101; 106A; 106C; 127; 133; 136; 140; 142; 147A; 160; 161; 166; 172; 180; 182; 183).

Because our classification is based on the wagons' metallic fittings (tyres, naves and box fittings), it is impossible to be certain to what extent it reflects their original appearance. Most of the functional and decorative elements of the wagon were made from organic materials, especially wood, and are almost always lost. Two wagons could have had exactly the same metallic fittings and could even have left the same layout of fittings on the grave floor but, for example, one may have had richly carved and painted wooden decoration while the other was plain. But it should be noted that the groupings of attributes related to the technology of wagon construction (particularly tyres, nails and the felloe construction) are found to correlate with groupings of primarily decorative attributes (especially nave and box fittings), which reinforces the validity of our wagon classification. It is therefore apparent that the metallic fittings were intimately related to their complementary organic parts. Nevertheless it must be appreciated that only a biased sample of wagon components has survived.

The main characteristics of each wagon type are described below.

8.2.1 Wagon type 1

Only one wagon of the Hallstatt period belongs to type 1, from Wehringen, 'Hexenberg', tumulus 8. There are, however, numerous parallels in the late Urnfield Bad Homburg group, for its naves and type i box fittings (see Ch. 3.6). Even though it is not certain that the naves and box fittings of the Bad Homburg group, associated together in late Urnfield hoards, were necessarily used on the same wagons, it is very likely that wagons like Wehringen were in use in the later Urnfield period, which justifies the creation of a special wagon type. Type 1 wagons have a West European distribution, in West Central France and on the Middle Rhine, with Wehringen being the most eastern example (Fig. 22).

8.2.2 Wagon type 2

Eight wagons can be assigned to this type, characterised by box fittings of type ii. Only three wagons, from Köngen, Beratzhausen grave 3 and Lengenfeld, had wheel fittings – simple bronze discs of Lengenfeld type, a tyre of miscellaneous type, a tyre of type Ia and a tyre of type IIIG. The other five wagons had neither nave fittings nor tyres. A further nine graves possibly contained

wagons of type 2, but their lack of unequivocal wheel fittings makes an interpretation difficult (see Ch. 7.2). These wagons have an interesting distribution with concentrations in Bavaria and on the Swabian Alb and an outlier in Upper Austria (Fig. 87).

- 1) Köngen (cat. no. 77).
 - 2) Meßkirch-Langenhart, 'Haggenberg' (cat. no. 79A).
 - 3) Meßstetten-Hossingen, tumulus 1 of 1867 (cat. no. 81).
 - 4) Beratzhausen, grave 3 (cat. no. 107B).
 - 5) Neukirchen-Gaisheim, tumulus 6 (cat. no. 129).
 - 6) Olching – Neu Esting, 'Leberberg' (cat. no. 131).
 - 7) Velburg-Lengenfeld, tumulus of 1870 (cat. no. 143).
 - 8) Mitterkirchen, tumulus X, grave 1 (cat. no. 178B).
- (The nine uncertain graves are listed in Ch. 7.2, nos 9–17)

8.2.3 Wagon type 3

Twenty-eight wagons can certainly be assigned to this type and in another two cases it is possible or probable. They are characterised by Breitenbronn naves or related nave types ('naves with nave-head rings but no nave-caps'; 'naves with nave-stock rings and nave-neck sheathings'). The Breitenbronn naves are associated on 13 or 14 wagons with tyres of types I, II, III and IV; the related naves are found on three or four wagons with type I and IV tyres. It is particularly important that every one of these 30 wagons lacked box fittings completely. The wagons of type 3 are found in South Germany and Central Bohemia, with outliers in Moravia and Upper Austria (Fig. 88).

- 1) Aglasterhausen-Breitenbronn, tumulus in the 'Häldenwald' (cat. no. 47).
- 2) Breisach-Gündlingen, 'Zwölferbuck' (cat. no. 56).
- 3) Klettgau-Geißlingen, tumulus H (cat. no. 76).
- 4) Tannheim, tumulus VI (cat. no. 93B).
- 5) Tannheim, tumulus XVI (cat. no. 93D).
- 6) Tannheim, tumulus XXI (cat. no. 93E).
- 7) Beilngries, 'Im Ried-Ost', grave 128 (cat. no. 105).
- 8) Beilngries, 'Im Ried-West', grave 74 (cat. no. 106B).
- 9) Dietfurt, 'Tennisplatz', grave 31 (cat. no. 108).
- 10) Ehingen-Belzheim, 'Mähder', tumulus 104 (cat. no. 112A).
- 11) Ehingen-Belzheim, 'Mähder', tumulus 109 (cat. no. 112B).
- 12) Emmerting-Bruck (cat. no. 113).
- 13) Großebstadt, cemetery I, grave 1 (cat. no. 114A).
- 14) Großebstadt, cemetery I, grave 4 (cat. no. 114B).
- 15) Großebstadt, cemetery II, grave 2 (cat. no. 115A).
- 16) Großebstadt, cemetery II, grave 14 (cat. no. 115C).
- 17) Hohenfels, 'Haidensbuch', tumulus II (cat. no. 119).
- 18) Illschwang-Gehrsricht, tumulus 2 (cat. no. 120).
- 19) Leipheim, 'Waldteil Justing-West', tumulus 14 (cat. no. 125).
- 20) Pilsach-Niederhofen, tumulus 4 (cat. no. 132).
- 21) Wehringen, 'Hungerbrunnenmähder', tumulus 1 (cat. no. 146).
- 22) Býčí-skála cave (cat. no. 148/v).
- 23) Hradenín grave 24 (cat. no. 151D).
- 24) Hradenín grave 46 (cat. no. 151I).
- 25) Straškov, tumulus of 1911 (cat. no. 168A).
- 26) Straškov, tumulus of 1913 (cat. no. 168B).
- 27) Mitterkirchen, tumulus II, grave 1 (cat. no. 178A).
- 28) Salzburg-Taxham (cat. no. 179).
- 29) Reichenau tumulus B (cat. no. 83).
- 30) Vikletice grave 138 (cat. no. 171B).

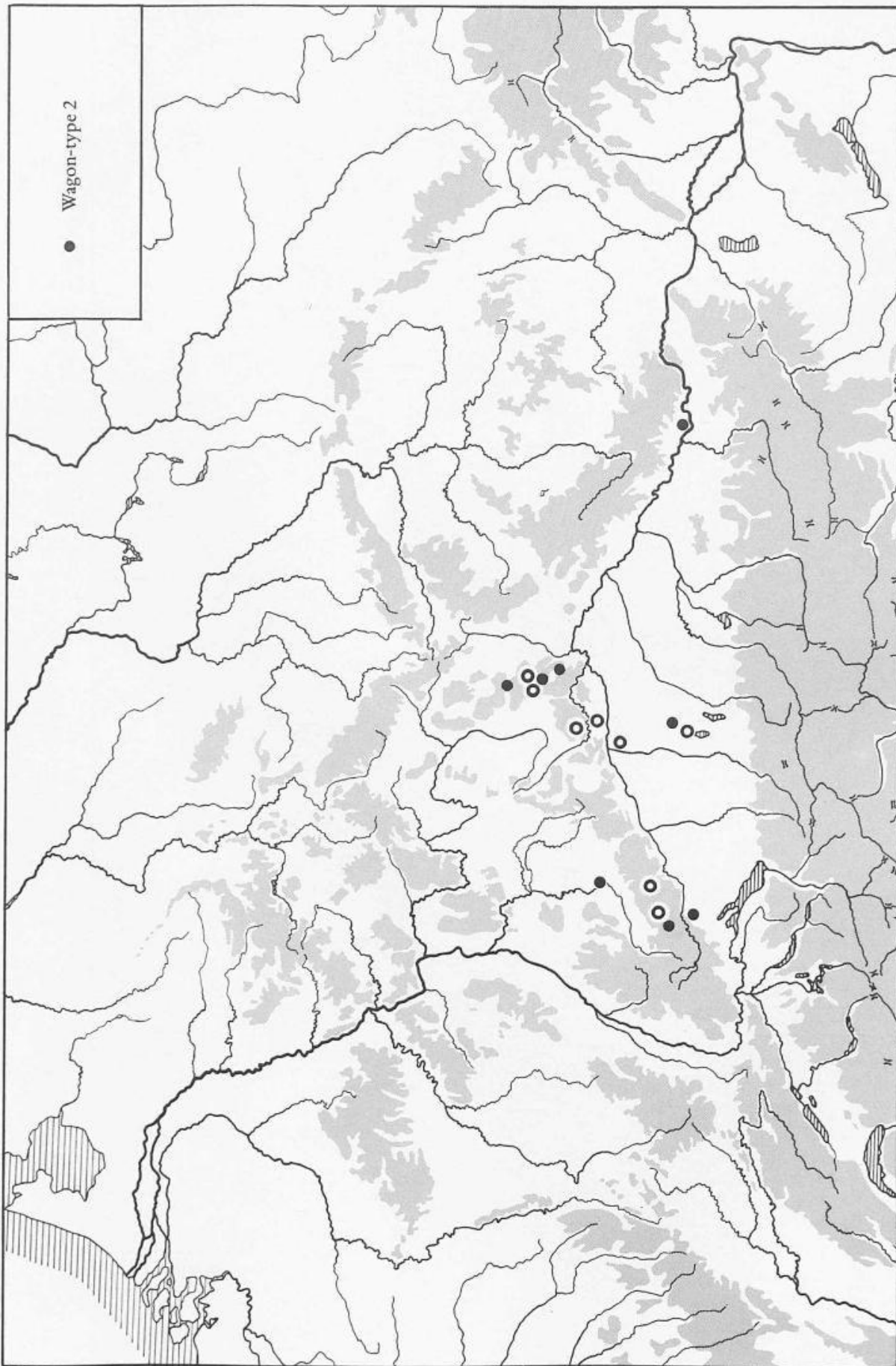


Fig. 87 The distribution of wagons of type 2.

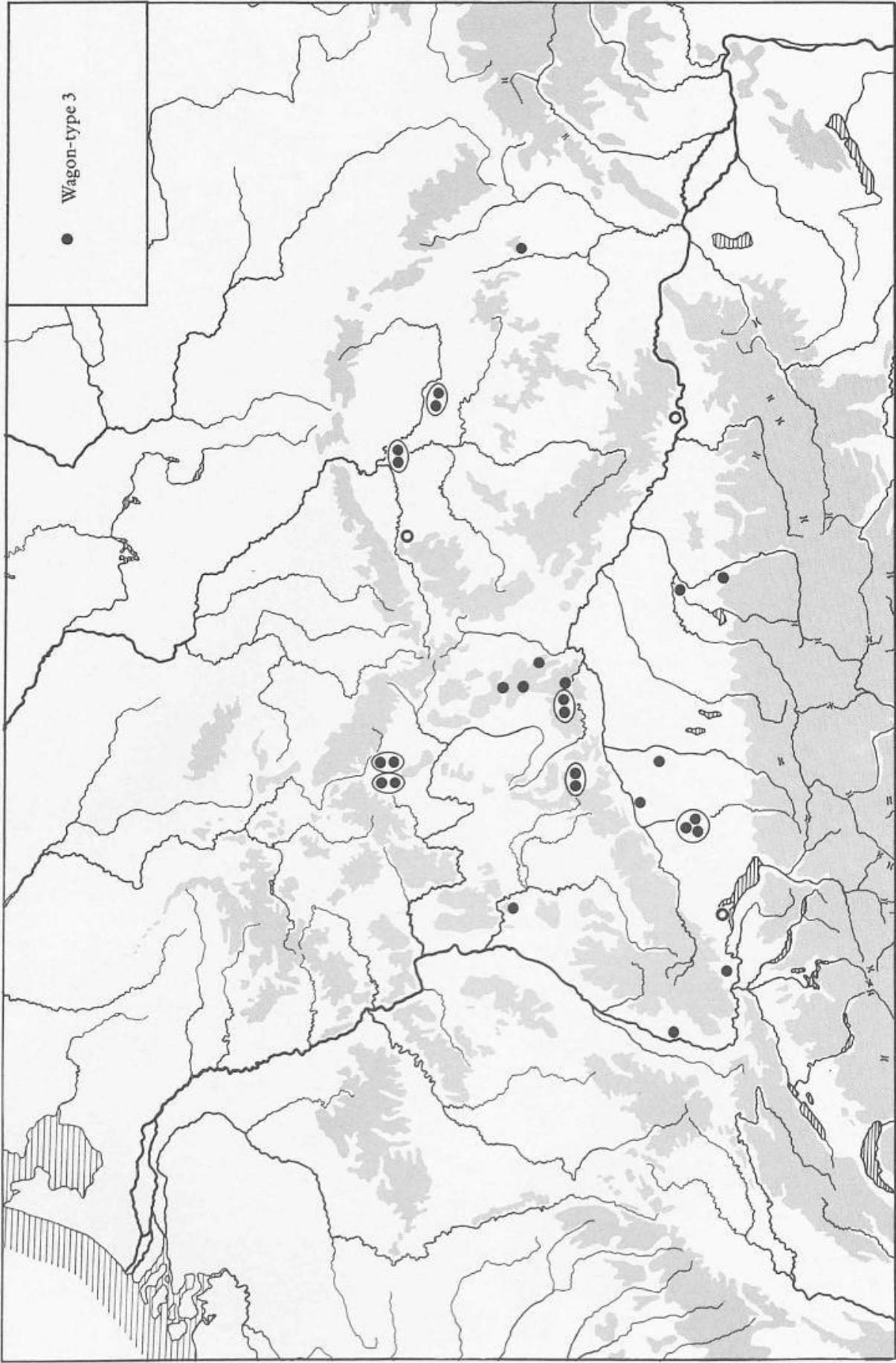


Fig. 88 The distribution of wagons of type 3.

8.2.4 Wagon type 4

This type includes seven wagons, with a further two wagons possibly belonging. All seven of the definite wagons had type iii box decoration, two had naves of type Ins (Ins, tumulus VI, lower grave; Dittenheim) and three had fragments of naves which may have been of type Ins (Blotzheim; Ohnenheim; Birnenstorf). From the two wagons which possibly belong to type 4, no box fittings survive and it is only the nave fittings which make them candidates. In the case of Dýšina, the fragment of a ribbed bronze nave-neck sheathing could have come from a nave of type Ins and the wagon therefore possibly belonged to type 4. In contrast, the ribbed nave-neck sheathing from Lhotka was of iron and only forms a distant parallel for the Ins nave type. The wagon from Lhotka is therefore only a very questionable candidate for type 4. Wagons of type 4 could be provided with tyres of type I (Aislingen), II (Ins; Dittenheim) or III (Ohnenheim). In the remaining graves no tyre fragments have survived from the wagon, and it is possible that they had wheels without iron tyres. Five of the wagons have a western distribution, in Switzerland, France and Holland; two were found in South Germany, in Bayerisch Schwaben and Mittelfranken. The two doubtful relatives of type 4 were found to the east, in Bohemia (Fig. 89).

- 1) Wijchen (cat. no. 1).
- 2) Blotzheim, 'Lisbühl' (cat. no. 3).
- 3) Ohnenheim (cat. no. 12).
- 4) Birnenstorf (cat. no. 20).
- 5) Ins, tumulus VI of 1848, lower grave (cat. no. 29B).
- 6) Aislingen, 'Oberes Ried', tumulus 1 (cat. no. 99).
- 7) Dittenheim (cat. no. 110).
- ??8) Dýšina tumulus 2 (cat. no. 150).
- ??9) Lhotka (cat. no. 153).

8.2.5 Wagon type 5

Twenty-eight wagons can be assigned to type 5. Type 5 is particularly characterised by naves with conical nave-necks sheathed in bronze sheet, and nave-heads which are either composed of a bronze nave-head ring and iron cap (types Erkenbrechtsweiler and Emerkingen) or formed in a composite tripartite shape (types Winterlingen and Vilsingen). Type V tyres, with their closely-spaced nails with large rectangular heads, are most typical for this wagon type, although type III tyres are also represented. On eight wagons of type 5, the box was decorated with fittings of type iv. Box type iv is especially characteristic for these wagons because no other type of metallic box decoration seems to have been used on them. The distribution of the wagons of type 5 is concentrated in the western part of the Swabian Alb (Fig. 90). Outliers are represented twice in Central Bohemia (Hradenín; Nymburk), in one cemetery in Upper Bavaria (Uffing), twice on the upper Rhine (Hügelsheim; Kappel-Grafenhausen), and once in the Lorraine region of East France (Marainville-sur-Madon).

- 1) Marainville-sur-Madon (cat. no. 11).
- 2) Albstadt-Ebingen, tumulus I of 1932 (cat. no. 48).

- 3) Bad Urach (cat. no. 53A).
- 4) Bitz (cat. no. 55).
- 5) Burladingen-Gauselfingen, tumulus of 1853 (cat. no. 58).
- 6) Emerkingen (cat. no. 60).
- 7) Engstingen-Großengstingen (cat. no. 61).
- 8) Erkenbrechtsweiler tumulus X (cat. no. 62).
- 9) Hügelsheim, 'Heiligenbuck' (cat. no. 68).
- 10) Immendingen-Mauenheim, tumulus N, grave 3 (cat. no. 70B).
- 11) Inzigkofen-Engelswies (cat. no. 71).
- 12) Inzigkofen-Vilsingen (cat. no. 72).
- 13) Kappel-Grafenhausen, tumulus 3 of 1976 (cat. no. 74B).
- 14) Neuhausen ob Eck, 'Hexenwiesen' (cat. no. 82).
- 15) Salem tumulus G (cat. no. 84A).
- 16) Sigmaringen (cat. no. 88).
- 17) Sulz am Neckar (cat. no. 92).
- 18) Ulm-Eggingen (cat. no. 95).
- 19) Villingen-Schwenningen, 'Magdalenenberg', grave 1 (cat. no. 96).
- 20) Winterlingen, tumulus III (cat. no. 97).
- 21) Unprovenanced, Württembergisches Landesmuseum (cat. no. 98A).
- 22) Unprovenanced, Württembergisches Landesmuseum (cat. no. 98B).
- 23) Uffing, 'Willing', tumulus 1 (cat. no. 141A).
- 24) Uffing, 'Willing', tumulus 6 (cat. no. 141B).
- 25) Uffing, 'Willing', tumulus 11 (cat. no. 141C).
- 26) Waltenhausen, 'Hairenbuch', tumulus III (cat. no. 144).
- 27) Hradenín grave 28 (cat. no. 151E).
- 28) Nymburk-Habeš (cat. no. 157).
- ??29) Švihov-Červené Poříčí (cat. no. 169).

8.2.6 Wagon type 6

A total of 19 wagons may be assigned to wagon types 6a (with type Repperndorf naves), 6b (with type Grandvillars naves), 6c (naves with simple iron nave-caps) and 6d (with type Kicklingen naves); a further nine wagons are possible members of the four types (Figs 69–70). From a further 20 to 22 wagons, only tyres of types VI and VII survive and some of them also probably belonged to wagons of type 6. Apart from the four types of nave which are characteristic for types 6a–d, only tyres of type VI are restricted to wagon type 6 (Fig. 81). The naves of wagon type 6 are related together by their simple undecorated iron fittings. However, wagon types 6a–d represent regional wagon traditions (Figs 69–70). The wagons of type 6a, characterised by Repperndorf naves, seem particularly typical for the area of the river Main, with an outlier in Prague (Praha-Bubeneč). The two certain wagons of type 6d (Kicklingen; Weinsfeld), with type Kicklingen naves, are located close together in Bayerisch-Schwaben and Mittelfranken. The wagon from Demmelsdorf, which may also be of type 6d, is situated not far away, in Oberfranken. Type 6b and 6c wagons, which are related to each other by their similar naves (type Grandvillars and naves with simple iron nave-caps), have a clear western distribution. The definite wagons of types 6b–c are to be found in the Rheinland-Pfalz, the Jura region of France, and in western Switzerland; all three of the examples in north Württemberg are uncertain members.

6a:

- 1) Offenbach-Rumpenheim (cat. no. 45).
- 2) Kitzingen-Repperndorf (cat. no. 123).
- 3) Leinach-Oberleinach (cat. no. 124).
- 4) Weismain-Görau, tumulus 3 (cat. no. 147B).
- 5) Praha-Bubeneč (cat. no. 164).
- ?6) Schwalbach, tumulus 1 (cat. no. 46).
- ?7) Igersheim-Simmringen (cat. no. 69).
- ?8) Immendingen-Mauenheim, tumulus M/3 (cat. no. 70A).

6b:

- 9) Grandvillars (cat. no. 8).
- 10) Saraz (cat. no. 14).
- 11) Hermrigen (cat. no. 28).
- 12) Bell (cat. no. 38).
- 13) Weilerbach (cat. no. 44).
- ?14) Savoyeux (cat. no. 15).
- ?15) Filderstadt-Plattenhardt (cat. no. 63).
- ?16) Stuttgart-Weilimdorf (cat. no. 91).

6c:

- 17) Ivory, 'tumulus de Champ Peupin' (cat. no. 10).
- 18) Châtonnay (cat. no. 22).
- 19) Grächwil (cat. no. 27).
- 20) Ins, tumulus VI of 1848, upper grave (cat. no. 29C).
- 21) Rances (cat. no. 32).
- 22) Urtenen (cat. no. 34).
- ?23) Ins, tumulus of 1849 (cat. no. 29E).
- ?24) Oberlahnstein, tumulus 3, grave 2 (cat. no. 43).
- ?25) Kirchberg a. d. Jagst-Lendsiedel (cat. no. 75).

6d:

- 26) Dillingen-Kicklingen (cat. no. 109).
- 27) Hilpoltstein-Weinsfeld (cat. no. 118).
- ?28) Schesslitz-Demmelsdorf (cat. no. 137).

8.2.7 Wagon type 7

Twenty-four wagons belong to type 7, and five further wagons are possible candidates. Furthermore, some of the 14 to 16 wagons from which only tyres of type VII survive could also have been of type 7. The wagons of type 7 form a well-defined group, with tyres of type VII, Cannstatt naves and in at least 10 cases with wagon-box decoration of type v. The wagons have a wide distribution (Fig. 91), from Rheinland-Pfalz, Burgundy, Switzerland, Baden-Württemberg, Bayerisch-Schwaben and Oberbayern, with outliers in Poitou (Quinçay), Upper Austria (Uttendorf tumulus 5) and Moravia (Býčí-skála cave).

- 1) Apremont, grave 1 (cat. no. 2A).
- 2) Apremont, grave 2 (cat. no. 2B).
- 3) 'Burgundy' (cat. no. 4).
- 4) Sainte-Colombe, 'tumulus de la Butte' (cat. no. 13A).
- 5) Sainte-Colombe, 'tumulus de la Garenne' (cat. no. 13B).
- 6) Veuxhautes-sur-Aube (cat. no. 16).
- 7) Allenlütten (cat. no. 19).
- 8) Niederweiler (cat. no. 42).
- 9) Asperg, 'Grafenbühl' (cat. no. 52).
- 10) Bad Urach (cat. no. 53B).
- 11) Eberdingen-Hochdorf (cat. no. 59).
- 12) Kappel-Grafenhausen, tumulus 1 of 1880 (cat. no. 74A).
- 13) Ludwigsburg, 'Römerhügel', chamber grave 1 (cat. no. 78).
- 14) Meßkirch-Langenhart, 'Haggenberg' (cat. no. 79B).
- 15) Stuttgart-Bad Cannstatt, grave 1 (cat. no. 90).

- 16) Augsburg-Wellenburg (cat. no. 103).
- 17) Donauwörth, 'Riegelholz', tumulus 10 (cat. no. 111).
- 18) Starnberg-Mühlthal, tumulus 1 of 1885 (cat. no. 139).
- 19) Býčí-skála cave, wagon i (cat. no. 148/i).
- 20) Býčí-skála cave, wagon ii (cat. no. 148/ii).
- 21) Býčí-skála cave, wagon iii (cat. no. 148/iii).
- 22) Býčí-skála cave, wagon iv (cat. no. 148/iv).
- 23) Helpfau-Uttendorf, tumulus 5 (cat. no. 176B).
- 24) Quinçay (Fig. 71a; Pare 1989b, fig. 12).
- ?25) Wohlen (cat. no. 36).
- ?26) Herberungen-Hundersingen, 'Gießbübel', tumulus 1, secondary grave 1 (cat. no. 64A).
- ?27) Herberungen-Hundersingen, 'Talhou', tumulus 4, central primary grave (cat. no. 64B).
- ?28) Hohenstein-Oberstetten, tumulus 2 (cat. no. 66B).
- ?29) Niederrieden, 'Lehbühl' (cat. no. 130).

Three wagons have a mixed character, combining elements from different wagon types. The nave from Harburg-Marbach has a conical bronze nave-neck sheathing similar to those of the conical naves of wagon type 5, but an iron nave-head which is best compared with the Breitenbronn and Ins naves of wagon types 3 and 4. The tyres on the wagon are of type I. Because the nave is unique it has been impossible to include it in any specific type and the wagon has therefore been assigned a transitional position between wagon types 4 and 5 (thus wagon type 4/5). A similar problem is apparent in the case of Hohmichele, grave VI. The bronze nave-neck sheathing and type iv box decoration is suited to wagon type 5, but the short cylindrical nave-head is comparable with the Repperndorf and Grandvillars naves of wagon type 6. Furthermore, the wagon from Hohmichele grave VI has type VII tyres, which would not be usual for a wagon of type 5. Therefore, the wagon has been given a position between wagon types 5 and 6 (thus wagon type 5/6). The fragmentary fittings from Uttendorf tumulus 2 seem to find their closest parallels on the Hohmichele wagon, and it has tentatively been included in wagon type 5/6.

Our study has been able to accommodate 174 wagons in the typological classification, out of a total of 228 wagons (see the table at the end of this chapter). Nineteen further wagon-graves are discussed below and are found to represent two further classes. It remains impossible to fit 35 wagon-graves into our typological system either owing to poor preservation or, very rarely, owing to atypical fittings.

The quality of our evidence, and in particular the relatively small number of modern excavations of well-preserved wagon-graves, has made a use of negative evidence rather difficult. Thus the absence of a certain type of wagon fitting in a grave cannot be judged significant if the grave was carelessly excavated. Iron fittings, in particular, were often discarded by nineteenth century excavators. However, the use of iron tyres is an important and characteristic feature of the Hallstatt period, and it is relevant to discuss wagon-graves in which they seem to be absent. A further group of graves is marked not only by a lack of tyres, but also of all other wagon fittings except for linchpins, which seem to have been deposited as *pars pro toto* of a wagon.

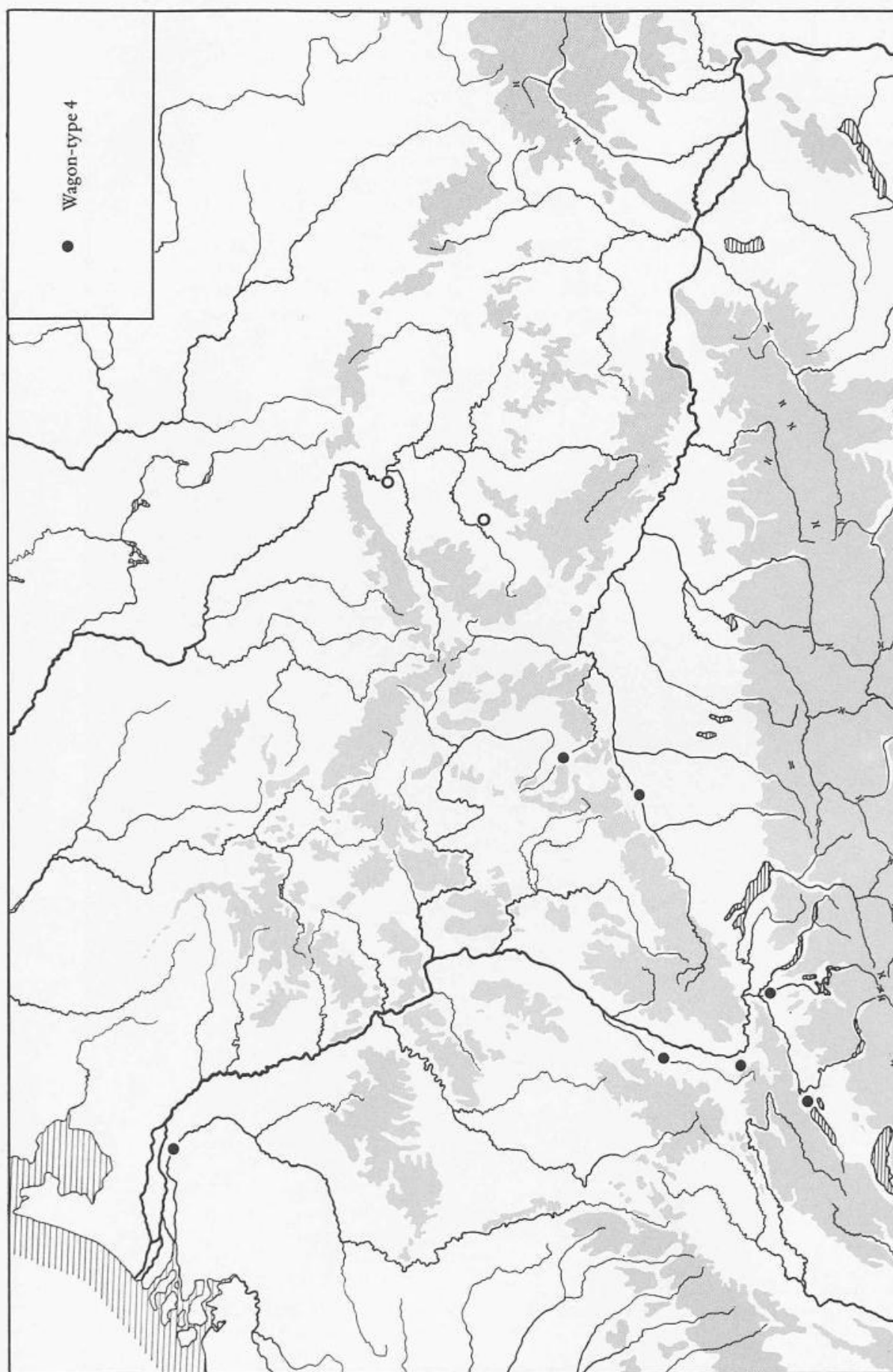


Fig. 89 The distribution of wagons of type 4.

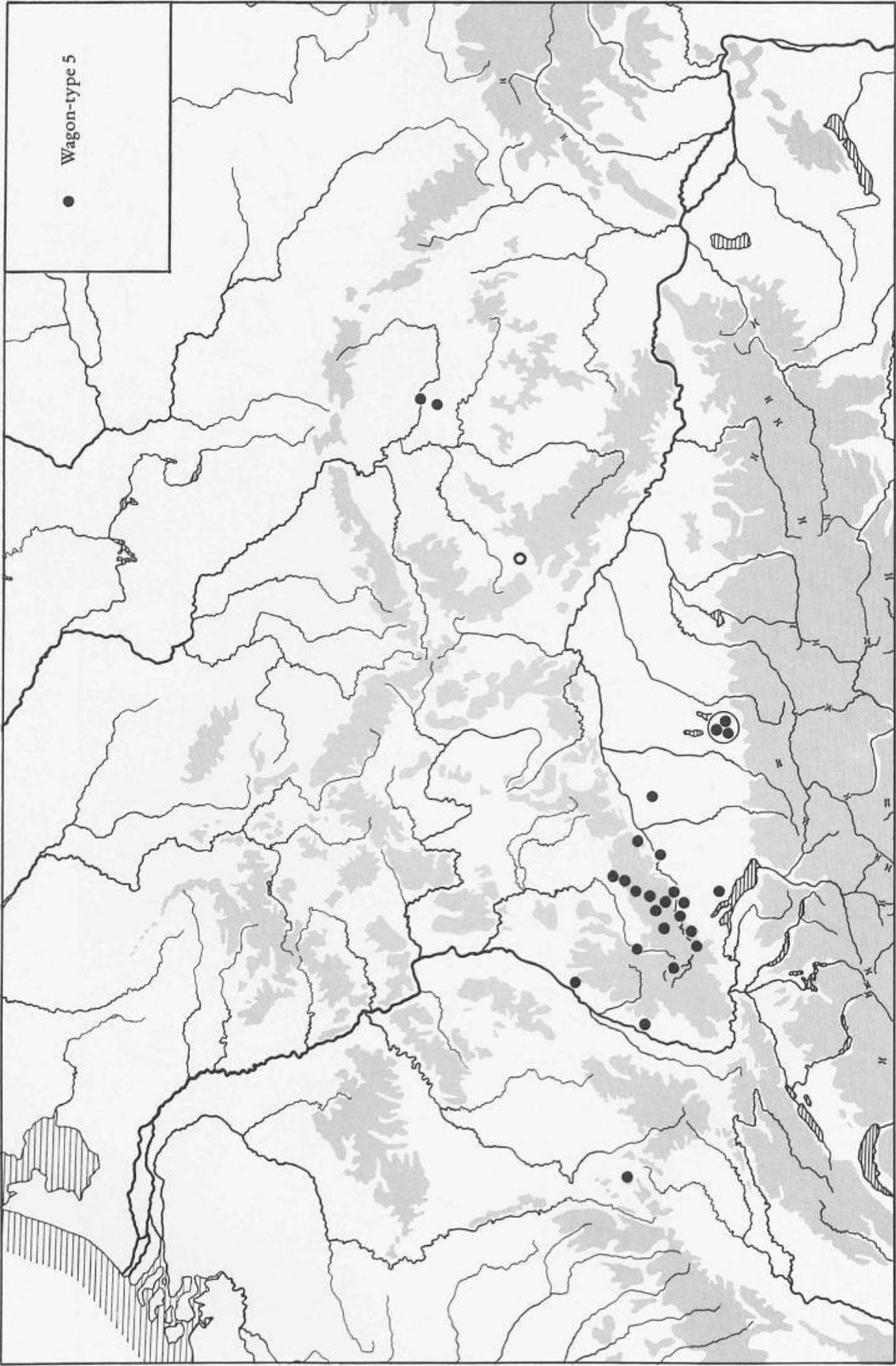


Fig. 90 The distribution of wagons of type 5.

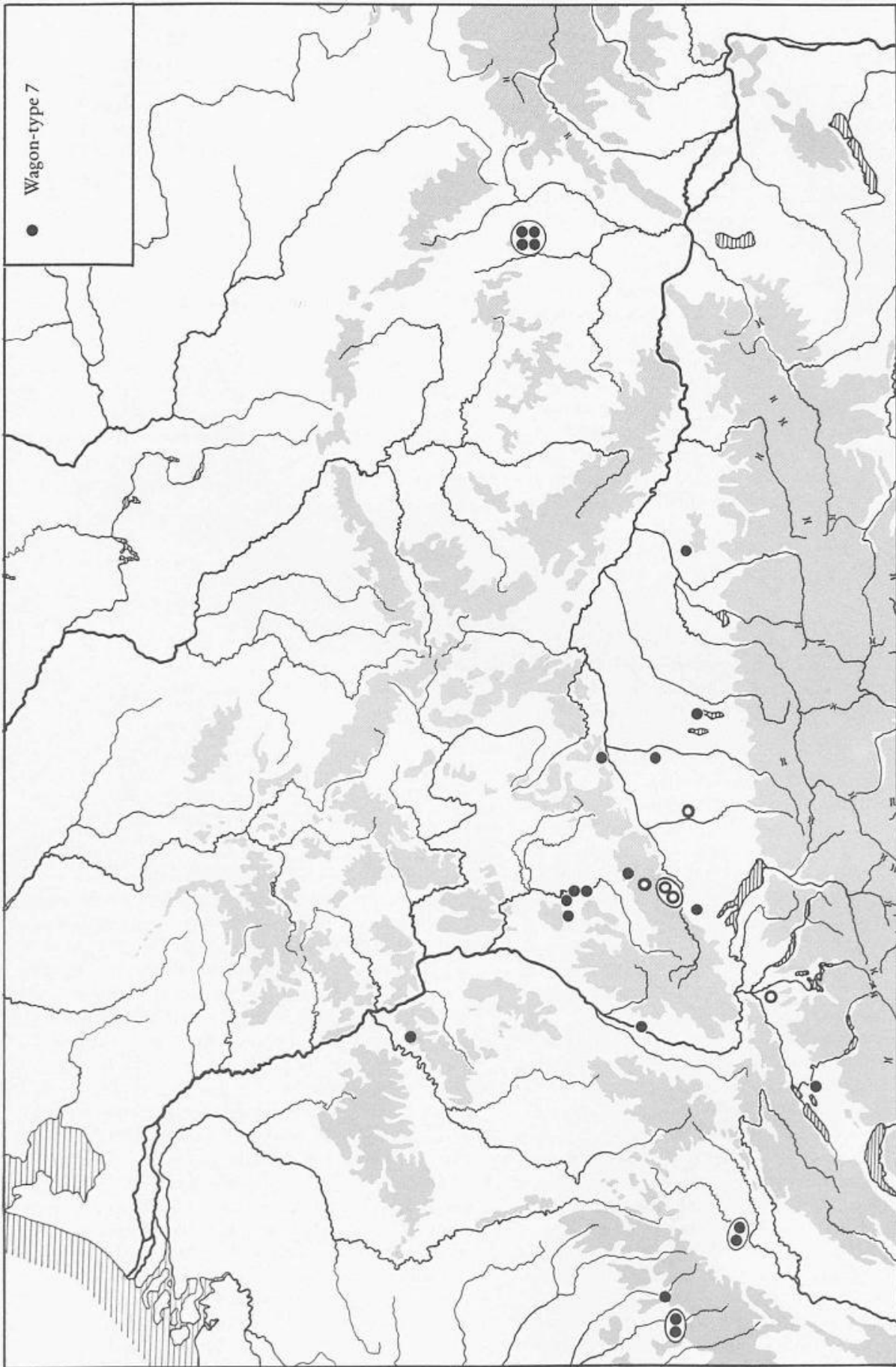


Fig. 91 The distribution of wagons of type 7.

8.3 WAGONS WITHOUT TYRES

Iron tyres were used on the great majority of wagons in Hallstatt period wagon-graves: of the total 228 wagons, they are lacking in only 12 or 13 well documented cases. Iron tyres were certainly not used on the wagon from Wehringen, 'Hexenberg', tumulus 8. In fact, there were no iron finds from this grave, which underlines its very early chronological position in the Hallstatt period. Not surprisingly, there is also no evidence that Wehringen's late Urnfield parallels had iron tyres. No iron fittings are represented in contexts with wagons of type 1.

The wheels of the wagons of type 2 do not seem to have been clad with metal fittings with any regularity, and for this reason it was found difficult to interpret a number of graves with box fittings of type ii. As many as 13 graves contained type ii box ornaments but no wheel fittings, and it was not certain whether the graves should even be regarded as containing wagons. Among these graves it is interesting to contrast the uniformity of their box decoration and of their burial rite, with the irregular use of metal fittings on the wheels. While the wagons display an extravagant use of bronze on the box, the wheels seem to have come a poor second-best.

The evidence is inconclusive for wagons of type 4, although tyres were not reported from Wijchen, Blotzheim and Birmenstorf. In the case of Wijchen, the tyres could have been left on the cremation pyre; in Birmenstorf, the surviving remains are all of bronze and one suspects that the iron finds were discarded by the excavators; as for Blotzheim, such meagre remnants survive from the wagon that the absence of tyre fragments may not be significant.

The two wagons without tyres from Mauenheim represent an isolated phenomenon (Figs 169–170). It seems most likely that tyres were not used at Mauenheim for local reasons, perhaps because the community was unable to obtain sufficient iron. The vehicle from Großebstadt, cemetery I, grave 4 is also atypical, not only because of its lack of tyres, but also because it only had metal fittings from two wheels. It is possible that the vehicle had small wheels, perhaps 400–500 mm in diameter, and a long rectangular box. In this case, the vehicle would neither have been a wagon nor a chariot, but perhaps a simply-made funerary cart (Fig. 186, 2). It is, in any case, an exceptional vehicle which should not be considered together with the elaborate four-wheeled wagons generally found in our wagon-graves.

Another exceptional find comes from Oberjettingen. The tumulus was excavated in 1955 and, although badly damaged, yielded about 70 fragments of iron nave fittings (Pl. 41B). In contrast, no tyre remains were found and it must be concluded either that the wagon was not provided with tyres, or the tyres were removed by grave robbers before they had rusted (as in the case of Hundesingen, 'Talhau', tumulus 4 and Riedenheim, 'Fuchsbühl').

Four wagon-graves without tyres form an interrelated group. The three graves from Bassenheim, in the Middle Rhine area, and the grave from Manětín-Hrádek, in

Bohemia, should be assigned to the end of the Hallstatt and the start of the La Tène period (see Ch. 10). All four graves have slots dug into their floors, in Manětín-Hrádek for a two-wheeled chariot (Fig. 212), and in Bassenheim for four-wheeled wagons. However, none of the graves contained iron tyres and only Manětín-Hrádek and Bassenheim tumulus 1 of 1969 had a few iron fragments which may have come from wagon fittings. These graves seem to reflect a situation at the very end of our period, in which wagons with very poor metal fittings could be provided for the dead.

8.4 LINCHPINS AS *PARS PRO TOTO* OF A WAGON

In 15 graves linchpins are the only wagon components represented among the goods. The linchpins were invariably of Bohemian type, except for those from Hallstatt grave 507 which are a related variant. Thirteen of the graves come from eight cemeteries in Bohemia, the other two are from Großebstadt and Hallstatt.

- 1) Großebstadt, cemetery II, grave 4 (cat. no. 115B).
- 2) Hradenín grave 5 (cat. no. 151B).
- 3) Hradenín grave 18 (cat. no. 151C).
- 4) Hradenín grave 30 (cat. no. 151F).
- 5) Hradenín grave 33 (cat. no. 151G).
- 6) Hradenín grave 58 (cat. no. 151J).
- 7) Miškovice (cat. no. 155).
- 8) Nehvizdky grave 1 (cat. no. 156A).
- 9) Nehvizdky grave 2 (cat. no. 156B).
- 10) Ohrada u Kolína (cat. no. 159).
- 11) Plaňany (cat. no. 162).
- 12) Rvenice, grave 1 of 1963 (cat. no. 165).
- 13) Tuchoměřice (cat. no. 170).
- 14) Vikletice grave 17 (cat. no. 171A).
- 15) Hallstatt grave 507 (cat. no. 175).

It could be suggested that these graves contained wooden wagons whose only metal components were their linchpins. But this is rendered unlikely by the position of the linchpins in the graves: grouped together in the south-east corner in Hradenín grave 5 (Fig. 204), and at one side of the chamber in Hradenín grave 30 (Fig. 208) and Großebstadt II/4. Furthermore, the number of linchpins varied: two in Großebstadt II/4, Hradenín graves 18, 30 and probably 33; three in Hradenín grave 5; four in Hradenín grave 58, Hallstatt grave 507, and possibly Nehvizdky graves 1 and 2. In Rvenice grave 1 of 1963, eight linchpins were originally present, marking the fictive positions of the pair of wagons thought suitable for the two inhumation burials.

These seem to be the only graves north of the Alps where wagon fittings were deposited in graves as *pars pro toto* of a wagon. The only possible exception is Pullach, 'Gruppe Süd', tumulus 3, if the 'L'-shaped sockets really functioned as components of the wagon-box (Pl. 87B). In the area studied, another possible example comes from Gornja Radgona, south of the Alps, where the only wagon fittings were two angle-sockets. In cremation graves, however, where the wagon was burnt on the pyre, only

part of the fittings may have been collected from the ashes and deposited in the grave. An example of this practice is the grave from Wijchen, where the grave finds include box fittings, axle-caps and linchpins. This should not be

confused with the practice of selecting a specific component of the wagon, typically linchpins, and providing it as *pars pro toto*, a part as representative or symbol of the whole wagon.

8.5 SUMMARY OF THE TYPOLOGICAL CLASSIFICATION

The following table summarises the typological classification of the wagons with typical fittings. Information is included on the tyres, felloes, wheel diameters, naves and boxes. Finally, each wagon is assigned to a wagon type, or a range of wagon types.

<i>Wagon (catalogue number)</i>	<i>Tyre type (I-VII)</i>	<i>Tyre-nail type (A-G)</i>	<i>Width of tyre (mm)</i>	<i>Felloe construction¹</i>	<i>Wheel diameter (cm)</i>	<i>Nave type²</i>	<i>Wagon-box type (i-v)</i>	<i>Wagon type (1-7)</i>
Wijchen (1)	—	—	—	—	—	—	iii	4
Apremont, grave 1 (2A)	VII	E	35	Go.	—	18	v	7
Apremont, grave 2 (2B)	VII	E	36	Go.	—	18	v	7
Blotzheim (3)	—	—	—	Gr.	—	—	iii	4
'Burgundy' (4)	—	—	—	—	—	18	—	7
Chouilly (5)	VI	D	22.5	Go.	60	—	—	6b/c
Grandvillars (8)	VI	E	25	—	—	15	—	6b
Hatten (9)	—	—	—	—	—	—	vi	6/27
Ivory (10)	VI	D	26	—	—	16	—	6c
Marainville (11)	V	C	—	—	—	8	—	5a
Ohnenheim (12)	III	—	19	Gr.	76.5	26	iii	4
Sainte-Colombe, La Butte (13A)	VII	D	42	Go.	—	18	v	7
Sainte-Colombe, La Garenne (13B)	VII	G	30	Go.	—	18	?vi	7
Saraz (14)	VI	G	22	—	—	15	—	6b
Savoys (15)	—	E	25	—	—	?15	—	?6b
Veuxhailles (16)	VII	D	32	Go.	—	18	—	7
Vix (17)	VII	G	30	Go.	74.5	—	—	6/7
Adiswil (18)	VII	E	30	Go.	—	—	—	6/7
Allenlütten (19)	VII	?D	34	Go.	—	18	—	7
Birmenstorf (20)	—	—	—	—	—	6/12	iii	4
Chabrey (21)	II	D	23	—	—	—	—	3/4
Châtonnay (22)	VII	D	31	Go.	—	16	—	6c
Diemerswil (24)	VII	D	28.5	Go.	—	—	—	6/7
Düdingen (25)	VII	D	29	Go.	—	—	—	6/7
Fraubrunnen (26)	VI	D	26	—	—	—	—	6b/c
Grächwil (27)	VI	E	27	—	—	16	—	6c
Hermrigen (28)	VI	D	24.5	Go.	55	?15	—	6b
Ins VI/1848, lower grave (29B)	II	D	24	—	—	6	iii	4
Ins VI/1848, upper grave (29C)	VII	D	30	Go.	—	16	—	6c
Ins 1849 (29E)	—	—	—	—	—	?16	—	?6c
Rances (32)	?VI	D	27	—	—	16	—	6c
Urtenen (34)	VI	—	27.5	—	—	16	—	6c
Wohlen (36)	—	—	—	—	—	?18	—	?7
Bell (38)	VII	—	29	?Go.	ca.75	15	vi	6b
Hennweiler (39)	VII	D-F	35	Go.	—	—	vi	6/27
Hundheim 1 (40A)	VII	D	27.5	Go.	—	—	—	6/7
Hundheim 2 (40B)	VI	D	24	—	—	—	—	6b/c
Niederweiler (42)	VII	—	36	Go.	—	18	—	7
Oberlahnstein (43)	VII	—	30	Go.	—	?16	—	?6c
Weilerbach (44)	VI	D	25	Go.	55	15	—	6b
Offenbach-Rumpenheim (45)	VII	F	35	Go.	—	14var.	—	6a
Schwalbach (46)	—	—	—	—	—	?14	—	?6a
Aglasterhausen-Breitenbronn (47)	II	—	25	?Br.	—	3	—	3a
Albstadt-Ebingen (48)	V	C	23	Go./Br.	—	11	—	5d

<i>Wagon (catalogue number)</i>	<i>Tyre type (I-VII)</i>	<i>Tyre-nail type (A-G)</i>	<i>Width of tyre (mm)</i>	<i>Felloe construction¹</i>	<i>Wheel diameter (cm)</i>	<i>Nave type²</i>	<i>Wagon-box type (i-v)</i>	<i>Wagon type (1-7)</i>
Albstadt-Truchtlengen (49)	III	G	23	Go./Br.	—	—	—	3-5
Heiligkreuztal, 'Wald Speckhau' (50)	VII	—	32	Go.	—	—	—	6/7
Heiligkreuztal, 'Hohmichele' I (51A _(in))	VII	—	36	Go.	—	—	—	6/7
Heiligkreuztal, 'Hohmichele' I (51A _(out))	VII	?E	40	?	?	—	—	6/7
Heiligkreuztal, 'Hohmichele' VI (51B)	VII	D-F	38	Go.	ca.68	13	iv	'5/6'
Asperg (52)	II	—	35	Go.	—	18	?v/vi	7
Bad Urach (53A)	—	—	—	—	—	?10	—	5?c
Bad Urach (53B)	—	—	—	—	—	18	—	7
Bitz (55)	V	C	23	Go./Br.	—	—	—	5
Breisach-Gündlingen (56)	—	—	—	—	—	3	—	3a
Buchheim (57B)	I	A	—	—	—	—	—	2-4
Burladingen-Gauselfingen (58)	V	C	—	?Go./Br.	—	—	—	5
Eberdingen-Hochdorf (59)	VII	?E	35	Go.	60-70	18	v	7
Emerkingen (60)	—	—	—	—	—	9	—	5b
Engstingen-Großengstingen (61)	V	C	—	—	—	8	—	5a
Erkenbrechtsweiler (62)	III	G	24	—	—	8	—	5a
Filderstadt-Plattenhardt (63)	—	—	22+	—	—	?15	—	?6b
Hundersingen 1/1 (64A)	VII	D-F	30	Go.	—	?18	—	?7
Hundersingen 4 (64B)	—	—	—	—	—	?18	—	?7
Hundersingen, 'Lehenbühl' (65)	VI	—	25+	?Go./Br.	—	—	—	6b/c
Hohenstein-Oberstetten 1 (66A)	—	—	—	—	70-80	—	?ii	?2
Hohenstein-Oberstetten 2 (66B)	—	—	—	—	—	?18	—	?7
Hohenstein-Ödenwaldstetten (67)	II	—	23	Gr./Br.	—	—	—	3/4
Hügelsheim (68)	V	C	24	—	—	11	iv	5d
Igersheim-Simmringen (69)	—	—	—	—	—	?14	—	?6a
Immendingen-Mauenheim M/3 (70A)	—	—	—	—	—	14var	iv	?6a
Immendingen-Mauenheim N/3 (70B)	—	—	—	Go.	60-68	?10	iv	5?c
Inzigkofen-Engelswies (71)	V	C	23	Go./Br.	—	—	—	5
Inzigkofen-Vilsingen (72)	V	C	25	—	—	11	iv	5d
Kappel-Grafenhausen 1 (74A)	VII	G	38	Go.	—	18	—	7
Kappel-Grafenhausen 3 (74B)	—	—	—	—	—	10	—	5c
Kirchberg-Lendseidel (75)	VII	—	42	Go.	—	?16	—	?6c
Klettgau-Geißlingen (76)	IV	G	24	Go.	68	3	—	3a
Köngen (77)	III	G	22	Gr.	120	—	ii	2
Ludwigsburg, 'Römerhügel' (78)	—	—	—	—	—	18	?v	7
Meßkirch-Langenhart (79A)	—	—	—	—	—	—	ii	2
Meßkirch-Langenhart (79B)	—	—	—	—	—	18	iv/v	7
Meßkirch-Ringgenbach (80)	VI	—	25	—	—	—	—	6b/c
Meßstetten-Hossingen (81)	—	—	—	—	—	—	ii	2b
Neuhausen ob Eck (82)	V	C	—	—	—	—	—	5
Reichenau (83)	IV	G	28	Gr.	ca.96	?5	—	?3c
Salem G (84A)	V	C	—	—	—	12	—	5
Sankt Johann 1897 (87)	VII	—	30	Go.	—	—	—	6/7
Sigmaringen (88)	V	C	19	—	—	12	—	5
Sigmaringen-Laiz (89A)	VII	—	24	—	—	—	—	6/7
Sigmaringen-Laiz (89C)	?VI	—	—	—	—	—	iv	5/6
Stuttgart-Bad Cannstatt (90)	VII	—	38.5	Go.	—	18	v	7
Stuttgart-Weilindorf (91)	—	—	—	—	—	?15	—	?6b
Sulz am Neckar (92)	V	C	19.5	—	—	8	—	5a
Tannheim VI (93B)	—	—	24	Gr.	—	5	—	3c
Tannheim XVI (93D)	II	—	25	—	—	3	—	3a
Tannheim XXI (93E)	II	—	25	—	—	3	—	3a
Ulm-Eggingen (95)	—	—	—	—	—	?11	iv	5?d
Villingen-Schwenningen (96)	V	C	22.5	Go.	48	—	—	5
Winterlingen (97)	III	G	23.5	—	—	10	—	5c
Unprovenanced (98A)	V	C	25.5	Go.	74	—	—	5
Unprovenanced (98B)	V	C	19	Go.	73	—	—	5
Aislingen (99)	Ib	A	22	Gr.	—	—	iii	4
Albertshofen (100)	II	G	25	?Gr.	86	—	—	3/4
Augsburg-Kriegshaber (102)	II	—	22	Go./Br.	—	—	—	3/4

<i>Wagon (catalogue number)</i>	<i>Tyre type (I-VII)</i>	<i>Tyre-nail type (A-G)</i>	<i>Width of tyre (mm)</i>	<i>Felloe construction¹</i>	<i>Wheel diameter (cm)</i>	<i>Nave type²</i>	<i>Wagon-box type (I-V)</i>	<i>Wagon type (1-7)</i>
Augsburg-Wellenburg (103)	VII	E	41	Go.	—	18	v	7
Merkershausen (104)	IV	G	25	?Go./Br.	—	—	—	3/4
Beilngries, 'Ried-Ost' 128 (105)	—	G	15.5	Gr.	90	3	—	3a
Beilngries, 'Ried-West' 74 (106B)	II	B	22.2	Gr.	—	3	—	3a
Beratzhausen (107B)	Ia	A	21	Gr.	—	2	ii	2a
Dietfurt (108)	Ib	A	23	Go.	69	4	—	3b
Dillingen-Kicklingen (109)	VII	F	30	Go.	52	17	—	6d
Dittenheim (110)	II	?C	26.5	Go./Br.	—	6	iii	4
Donauwörth (111)	VII	D-F	34	Go.	—	18	v	7
Ehingen-Belzheim 104 (112A)	III	G	21	?Br.	—	3	—	3a
Ehingen-Belzheim 109 (112B)	IV	—	26	Go./Br.	—	4	—	3b
Emmerting-Bruck (113/i)	II	G	20	Br.	—	?3	—	?3a
Emmerting-Bruck (113/ii)	II	B	25	Gr./Br.	104	?3	—	?3a
Großbeibstadt I/1 (114A)	Ia	A	23	Gr.	90	3/II	—	3a
Großbeibstadt I/4 (114B)	—	—	—	—	—	5	—	3c
Großbeibstadt II/2 (115A)	?I	?A	—	Gr.	—	3/I	—	3a
Großbeibstadt II/14 (115C)	—	—	—	Gr.	—	3/II	—	3a
Haldenwang (116)	II	?C	21	?Br.	—	—	—	3/4
Harburg-Marbach (117)	Ib	A	24	Gr.	—	7	—	'4/5'
Hilpoltstein-Weinsfeld (118)	VII	E	37	Go.	61	17	—	6d
Hohenfels (119)	III	G	16	Go.	70-80	3	—	3a
Illschwang-Gehrsricht (120)	III	G	23	—	—	3/II	—	3a
Kitzingen-Repperndorf (123)	VII	E	31	Go.	56	14	—	6a
Leinach-Oberleinach (124)	—	E	26	Go./Br.	—	14	vi	6a
Leipheim (125)	Ib	A	25	Gr.	—	3	—	3a
Lupburg-Gottesberg 1 (126A)	Ia	A	22	Gr.	—	—	—	2-4
Lupburg-Gottesberg 3 (126B)	III	B	18	Go.	68	—	—	3-5
Nennslingen-Wengen (128)	VII	—	30	Go.	—	—	—	6/7
Neukirchen-Gaisheim (129)	—	—	—	—	—	—	ii	2b
Niederrieden (130)	—	—	—	—	—	?18	—	?7
Olching-Neu Esting (131)	—	—	—	Gr.	—	—	ii	2b
Pilsach-Niederhofen (132)	III	G	20	Br.	—	3	—	3a
Schesslitz-Deimmelsdorf (137)	VII	D-F	30	Go.	—	?17	—	?6d
Schmidmühlen-Markhof (138)	Ia	A	20.5	Go./Br.	—	—	—	2-4
Starnberg-Mühlthal (139)	—	—	—	—	—	18	v	7
Uffing 1 (141A)	—	—	—	—	—	?10	—	5?c
Uffing 6 (141B)	V	C	22.5	Go./Br.	—	8/10	iv	5a/c
Uffing 11 (141C)	V	C	27	—	—	?8	iv	5?a
Velburg-Legenfeld (143)	—	G	21	Gr.	—	2	ii	2a
Waltenhausen (144)	V	C	24	Go./Br.	—	?8	iv	5?a
Wehringen 8 (145)	—	—	—	—	—	1	i	1
Wehringen 1 (146)	—	—	29	Gr.	—	4	—	3b
Weismain-Görau 3 (147B)	VII	E	31.5	Go.	—	14	—	6a
Býčů-skála (148/i)	VII	D	39	Go.	60	18	?v	7
Býčů-skála (148/ii)	VII	F	37.5	Go.	53	18	?v	7
Býčů-skála (148/iii)	VII	F	40	Go.	58	18	?v	7
Býčů-skála (148/iv)	—	—	—	—	—	18	?v	7
Býčů-skála (148/v)	—	—	—	—	—	3	—	3a
Dolany (149)	II	B	24	—	—	—	—	3/4
Dýšina (150)	—	—	—	—	—	?6	—	?4
Hradenín 24 (151D)	Ia	A	22	Gr.	—	5	—	3c
Hradenín 28 (151E)	III	G	21	Go.	71	8	iv	5a
Hradenín 46 (151I)	—	G	19	Gr.	—	3/II	—	3a
Kladruby (152)	VII	F	28.5	—	—	—	—	6/7
Lhotka (153)	Ia	A	23	Gr.	—	?6	—	?4
Nymburk (157)	V	C	25	Go./Br.	—	8	—	5a
Poláky (163)	II	—	27	Go.	65	—	—	3/4
Praha-Bubeneč (164)	VII	G	35	Go.	51	14	—	6a
Straškov 1911 (168A)	—	—	—	Gr.	—	3	—	3a
Straškov 1913 (168B)	II	—	21	?Br.	—	3	—	3a

<i>Wagon (catalogue number)</i>	<i>Tyre type (I-VII)</i>	<i>Tyre-nail type (A-G)</i>	<i>Width of tyre (mm)</i>	<i>Felloe construction¹</i>	<i>Wheel diameter (cm)</i>	<i>Nave type²</i>	<i>Wagon-box type (i-v)</i>	<i>Wagon type (1-7)</i>
Švihov-Červené Poříčí (169)	—	—	—	—	—	12	—	25
Vikletice 138 (171B)	—	—	—	Gr.	—	23	—	23a
Amstetten (173)	VI	G	25	—	—	—	—	6b/c
Uttendorf 2 (176A)	VII	E	32.5	Go.	—	13	—	5/6'
Uttendorf 5 (176B)	VII	—	36.5	Go.	—	18	v	7
Lengau, 'Galgengholz' (177)	VII	G	31	Go.	—	—	—	6/7
Mitterkirchen II/1 (178A)	—	—	27	—	—	4	—	3b
Mitterkirchen X/I (178B)	—	—	—	—	—	—	ii	2b
Salzburg-Taxham (179)	—	—	—	—	—	3/1	—	3a
Wörgl (181)	Ib	A	20	Gr./Br.	78-103	—	—	2-4

Notes:

1 Felloe construction (Br. = Bruck, Go. = Gottesberg, Gr. = Großeibstadt felloe type).

2 Nave type (the numbers 1-18 signify the 18 different nave types, see the headings in Ch. 5).

CHAPTER 9

The Construction and Reconstruction of the Hallstatt Wagon

In our classification of Hallstatt period wagons it was impossible to use many of the wagons' essential attributes. Ideally it would be desirable to classify the wagons according to their basic dimensions (size of wagon-box, wheel gauge and base, wheel diameters), the form of the perch and draught pole, the construction of the front axle (fixed or pivoted) and their decoration, particularly in textiles, leather and wood-carving. However, our knowledge of this basic information is generally either fragmentary or non-existent. Instead, recourse was necessarily made to metallic fittings and it is on this aspect of the wagons that our typological classification was founded.

Details of the wagons' wooden construction can be deduced from traces of wood which have been preserved, impregnated with bronze or iron oxide, on metal fittings – although wooden wagon components have survived in rare cases and are also naturally of prime importance. A study of the metallic fittings themselves yields further technical data. This technological information about wagon construction will serve in a small way to counteract the imbalance in our study so far, caused by our inevitable reliance on the classification of the metallic wagon fittings.

The wagon reconstructions exhibited in 1987 in the Römisch-Germanisches Zentralmuseum, Mainz, added much to our understanding of wagon construction in the Hallstatt period and detailed information can be gained from the exhibition publication (Barth 1987; Biel 1987; Egg 1987a; Egg and France-Lanord 1987; Joachim 1987; Unze 1987).

9.1 SPOKES

The number of spokes per wheel is known on only 19 wagons. On 16 wagons the wheels had eight or 10 spokes, the other three wagons had wheels with six, 12 or 16 spokes.

Six spokes:

- 1) Hradenin grave 28 (cat. no. 151E).

Eight spokes:

- 2) Sainte-Colombe, 'tumulus de la Butte' (cat. no. 13A).
- 3) Immendingen-Mauenheim, tumulus M, grave 3 (cat. no. 70A).
- 4) Ludwigsburg, 'Römerhügel', chamber grave 1 (cat. no. 78).
- 5) Sulz am Neckar (cat. no. 92).
- 6) Hradenin grave 24 (cat. no. 151D).
- 7) Hradenin grave 46 (cat. no. 151I).

Ten spokes:

- 8) Vix (cat. no. 17).
- 9) Altheim-Heiligkreuztal, 'Hohmichele', grave VI (cat. no. 51B).
- 10) Eberdingen-Hochdorf (cat. no. 59).
- 11) Köngen (cat. no. 77).
- 12) Stuttgart-Bad Cannstatt, grave 1 (cat. no. 90).
- 13) Beilngries, 'Im Ried-West', grave 74 (cat. no. 106B).
- 14) Harburg-Marbach, tumulus 1 of 1973 (cat. no. 117).
- 15) Býčí-skála cave, wagon i (cat. no. 148/i).
- 16) Býčí-skála cave, wagon ii (cat. no. 148/ii).
- 17) Býčí-skála cave, wagon iii (cat. no. 148/iii).

Twelve spokes:

- 18) Apremont, 'tumulus de la Motte', grave 2 (cat. no. 2B).

Sixteen spokes:

- 19) Großeibstadt, cemetery I, grave 1 (cat. no. 114A).

Nothing is known of the form of the spokes of wagon types 1, 2 and 3, which had no metallic spoke fittings. We are a little better informed about the spokes of wagon types 4 and 5, which seem to have been round or slightly oval in cross-section and tapered towards the middle. The spokes are well preserved from the wagons of type 5 from Hügelshheim (Pl. 38, 4.8–10), Vilsingen (Zürn 1987, pl. 351, 4) and the Magdalenenberg (Pl. 52, 1). The spokes from the Magdalenenberg can be taken as typical for wagon type 5. They tapered from the nave to the felloe, and had flaring ends (Pl. 52, 1). Apart from the surviving spokes from Hügelshheim and Vilsingen, the Magdalenenberg type of spoke is also attested by the spoke sleeves of the type 4 wagon from the lower grave of Ins tumulus VI (Drack 1958a, 36, fig. 36, 5–6) and probably also the type 5 wagon from Sulz am Neckar (Pl. 50A, 3).

The spokes from Hohmichele, grave VI, by contrast, did not taper and apparently had a subrectangular cross-section. On wagons of type 7, the spokes were very often housed in bronze or iron cylinders which either did not taper (Apremont graves 1 and 2; Sainte-Colombe, 'La Butte'; Ludwigsburg; the Býčí-skála wagons), or tapered very slightly (Hochdorf). On two wagons of type 7, similar slightly tapering spokes were provided with ribbed iron spoke collars (Hundersingen, 'Talhou', tumulus 4, Pl. 37A; Augsburg-Wellenburg, Pl. 60A, 10.12–16).

The spokes always seem to have been set into the nave and felloe with rectangular tenon joints. The tenons at the ends of the spokes were positioned at right-angles: the one fitted into the nave was orientated parallel to the axle, the one fitted into the felloe was orientated parallel to the tyre

(see for example the complete spoke from the Magdalenenberg, Pl. 52, 1).

On wheels with double felloes, the tenons of the spokes probably usually penetrated through both felloe layers. This is occasionally evidenced by the rectangular impressions of the ends of the spoke tenons on the inner surface of the tyres. Tenon impressions have been found on the tyres of six wagons: four with Großebstadt felloes (Köngen; Beilngries, 'Im Ried-West', grave 74, Pl. 62, 10; Großebstadt, cemetery I, grave 1, Pl. 73, 1; Wehringen, 'Hungerbrunnenmähder', tumulus 1, Pl. 97B, 1), one with either Bruck or Gottesberg felloes (Augsburg-Kriegshaber, Pl. 58A, 6) and one with felloes of Gottesberg type (Weinsfeld, Pl. 77A, 7). Normally on wheels with Gottesberg felloes, the tenons only extended half-way into the felloe, as in the case of the Magdalenenberg wagon where the tenons were 21 mm long and the felloe was 48 mm thick (see also the wagons from Offenbach-Rumpenheim and Hochdorf). Indeed, on wheels with double felloes, the long spoke tenons would have helped to bind the two felloe layers, while with Gottesberg felloes this was not necessary and the spoke tenons were probably normally shorter.

9.2 WHEEL DIAMETERS

It has often been possible to estimate the diameters of the wheels, mostly by measuring the curvature of their tyres. It should be stressed, however, that great caution is necessary in the measurement of tyre diameters because the original curvature of the tyres has often been changed by deformation, in most cases probably when the wagon

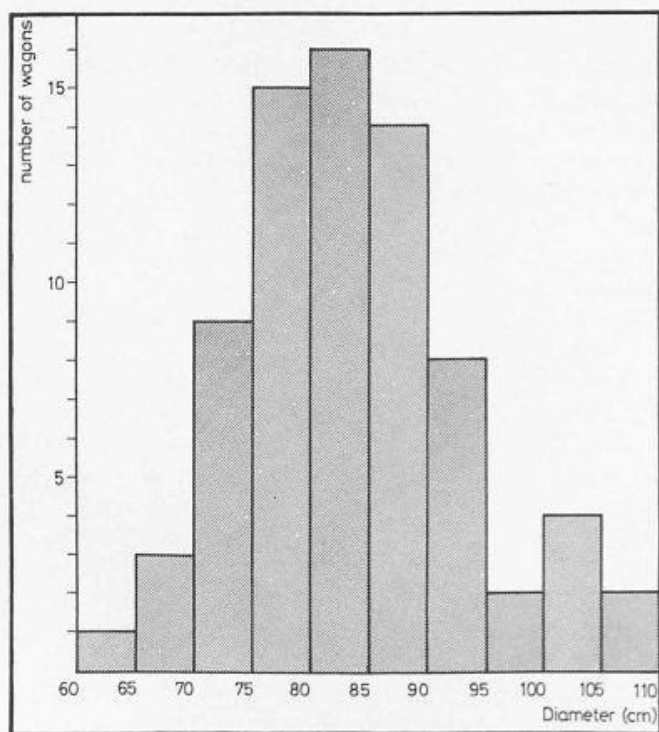


Fig. 92 Graph showing the diameters of the wheels on Hallstatt wagons.

was crushed by the collapse of its grave chamber. Nevertheless, the wheel diameters of 74 wagons could be calculated, ranging from 0.625 m to ca. 1.08 m (Fig. 92; see Ch. 8.5). More than 83% of the wagons had diameters ranging from 0.70 to 0.95 m, only four wagons had diameters less than 0.70 m, and only eight with diameters more than 0.95 m (less than 0.70 m, cat. nos: 110; 120; 176A; 182. More than 0.95 m, cat. nos: 38; 77; 99; 100; 107B; ?113/ii; 132; 147B).

It must be concluded that a wheel diameter of 0.70–0.95 m was the norm in the Hallstatt period, as was the use of eight to 10 spokes. The variations in the number of spokes and the wheel diameters do not seem to have any correlation with each other and neither variation was found to correlate with the use of a particular felloe construction, a particular wagon type, or type of wagon fitting.

9.3 SHRINK FITTING OF TYRES

It is not always certain exactly how the iron tyres were fitted to the wheels. The tyres could be fitted to the felloe cold, the ends being held together by a nail or rivet. On the other hand, the ends of the tyres could be hammer-forged together, to form a hoop of exactly the right size, then heated over a fire to expand the metal. The red-hot tyre could then be fitted over the wheel: after cooling, the tyre would shrink to give a tight fit, holding the tyre to the felloe and at the same time tightly holding together the nave, spokes and felloe.

Shrink fitting of tyres certainly seems to have been practised by craftsmen on some La Tène period chariot wheels, considering that the tyres often had no nails at all (Piggott 1983, 215–7). The same must be true for the tyres without nails on the wagon from Como-Ca' Morta, grave of 1928. The fact that joins are so rarely visible on tyres of the Hallstatt period may argue that many of them were likewise shrunk on. Thus if a tyre had been made into a hoop by joining the ends by hammer-welding it is unlikely that the join would today be visible, particularly considering the normally poor state of preservation and conservation of iron artefacts.

Information on joins is available from only nine tyres. In four cases, the ends of the tyre seem to have been held together by nails driven into the wooden felloe: Chouilly (Pl. 10B, 2); Ohnenheim (Pl. 10E, 1); Saraz (Pl. 20A, 4); possibly one of the tyres from Winterlingen (Pl. 53, 1). Traces of a hammer-welded join are visible on three tyre fragments. On the wagon from Repperndorf the ends of the tyre were overlapped for about 34 mm and presumably hammer-welded together; the join does not seem to have been held by a nail or rivet (Pl. 79B, 5). Perhaps the join is visible only because it was a failed hammer-weld. For example the ends of the tyre may not have been heated to a high enough temperature or an oxidation layer could have formed on the surface of the metal, inhibiting the join. On the other hand, differential corrosion could have attacked the iron at the join, making the join more obvious than it was originally.

The same could be true for a join visible on a tyre from Mitterkirchen, tumulus II, grave 1. The ends of the tyre were overlapped for little more than 10 mm and were joined only by welding, without a nail being necessary. Welded tyre joins have also been reported for the wagon from Offenbach-Rumpenheim (Frohberg 1974, 144). Frohberg wrote that on three of the tyres from this wagon the joins were invisible, clearly indicating hammer-welding at a high temperature. In contrast, the ends of the fourth tyre had been overlapped for 115 mm and held together with a nail. It seems that on the fourth tyre the welded join had failed and the overlapped and nailed join represents a repair. Welded tyres also seem to have been used on the wagons from Bell and Vix: traces of tyre joins were visible on neither wagon. Kimmig and Rest published a join on a tyre fragment from Kappel, tumulus 1 of 1880; however the author also studied the fragment and could see no signs of a join (compare Pl. 41C, 5 with Kimmig and Rest 1954, 181, fig. 1, 10).

Because hammer-welding requires heating the iron to a high temperature, it is clear that the welded tyres were joined and made into hoops before being fitted to their wooden felloes. It also seems probable that the tyres were heated and shrunk onto the wheels, the only way to ensure a tight fit. How many tyres were hammer-welded will remain unknown, until they have been subjected to detailed structural analysis and X-ray examination. Nevertheless, the rarity of nailed or riveted tyre joins suggests that hammer-welding and shrink fitting of tyres was widespread in the Hallstatt period.

9.4 THE DRAUGHT POLE AND THE QUESTION OF THE PIVOTED FRONT AXLE

Metallic fittings have survived from the poles of only three wagons: Hochdorf, Apremont grave 2, and Sainte-Colombe, 'La Butte'. All three of these wagons were exceptionally richly decorated with metal fittings whereas most wagons had an undecorated undercarriage and draught pole.

The pole of the Hochdorf wagon was 2.38 m long with a pointed oval cross-section measuring 50 mm in thickness; the pole tapered from a width of 158 mm at the base to 72 mm at the tip. Its upper surface was completely covered with engraved iron sheet, but the lower surface was left bare. The base of the pole was mounted on an axle so that it could move in a vertical direction. Its base terminated in a 'T'-shape with cylindrical arms. To either side of this was a cylinder of the same diameter. A pole axle ran through the three cylinders and was held in place by a pair of axle-caps (Fig. 93).

The Hochdorf pole fittings are very closely paralleled on the wagon from Como-Ca' Morta, grave of 1928 (Fig. 95). The Ca' Morta fittings not only show how the Hochdorf pole was attached to its wagon, but also that the Hochdorf wagon must have had a pivoted front axle (for Ca' Morta, see: Baserga 1929; Ghislanzoni 1930; Woytowitsch 1978, no. 112). Like Hochdorf, the Ca' Morta pole was covered with metal, although bronze was used now instead of iron. The base of the pole terminated in a 'T'-shaped cylinder (Pl. 133, 2). To either side of the base of the pole was another cylinder of the same diameter (Pl. 133, 1). These three cylinders housed an axle which allowed the pole to move in a vertical direction. The flanking cylinders were covered for about three-quarters of their surface with ribbed bronze sheet. On each cylinder, one end of the sheet was bent outwards to form a waisted flange (Pl. 133, 1). The metal fittings of the pole axle are, thus far, very similar to those on the Hochdorf wagon. However, the metallic covering from Ca' Morta continues further than on the Hochdorf wagon, showing that the cylinders flanking the pole base were actually the ends of massive wooden rods measuring 460 mm in length (Pl. 133; Fig. 95). Without doubt the Hochdorf wagon was provided with similar rods, which connected the pole to the rest of the wagon.

The function of the Ca' Morta rods can be understood by analogy with the wagon from Dejbjerg (Fig. 94). Here the base of the pole was bifurcated but, like Hochdorf and Ca' Morta, was attached to the wagon by means of a pole axle and two wooden rods with cylindrical heads (Hayen 1983, 457f.). Hayen made an important study of the

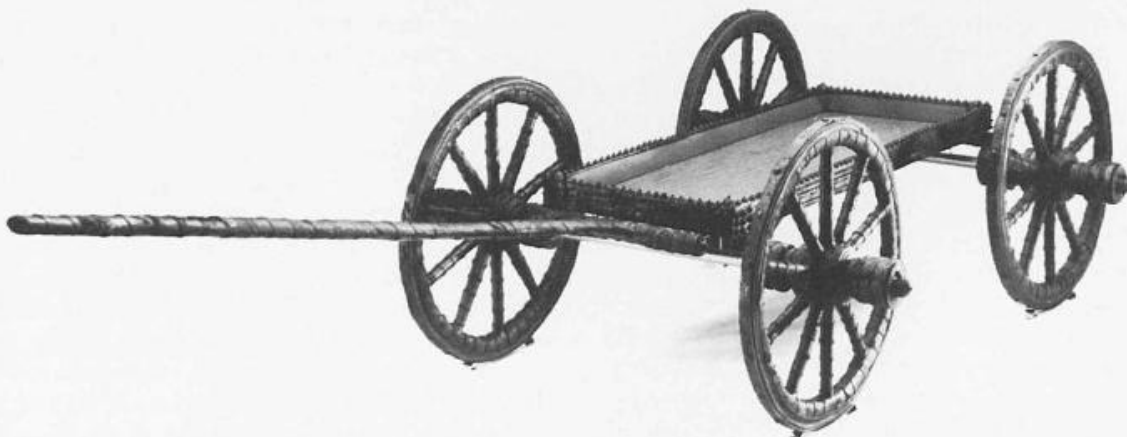


Fig. 93 The wagon from Hochdorf (photograph kindly supplied by J. Biel, Stuttgart).

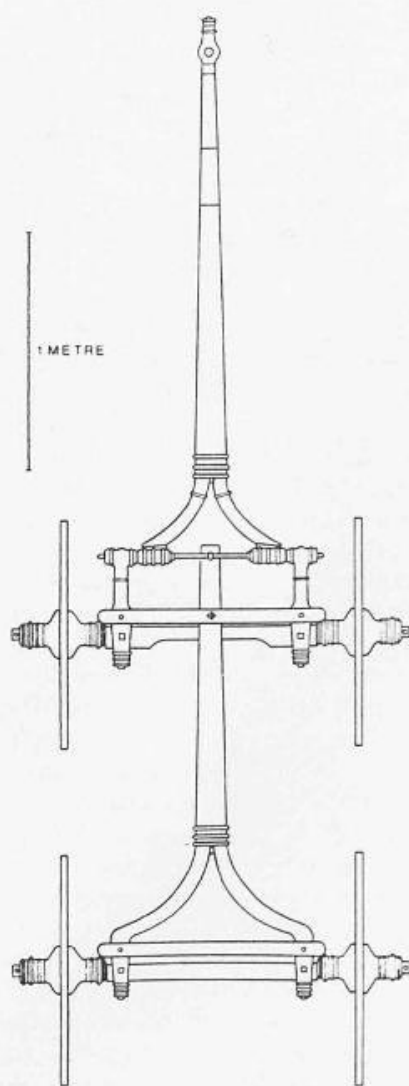


Fig. 94 *Dejbjerg, reconstruction of the undercarriage by H. Hayen (after Sleeswyk 1987).*

Dejbjerg wagon and related finds, and was able to explain these pole fittings. He called the rods 'Zugarme' (traction-rods) and gave this type of construction the name 'Zugarmekonstruktion' (traction-rod construction). The traction-rods from Dejbjerg each had two perforations. On the Ca' Morta traction-rods, only one perforation is attested by a circular hole in the bronze sheet cover, but another perforation can be assumed in the part of the rod which was not clad with bronze sheet (Fig. 95; Pl. 133, 1). On the wagon from Dejbjerg, the two traction-rods were attached by rivets to the front axle, and a wooden cross-bar was held between the central perforations of the two cylinder-headed rods. The perch of the wagon was then attached to the middle of the cross-bar by a single iron 'kingpin' (Fig. 94). This system of attachment formed a rigid connection between the pole and the front axle, while at the same time allowing the front axle and pole to pivot freely around the kingpin. The form of the Ca' Morta cylinder-headed traction-rods (Pl. 133, 1) can only

be explained by a similar undercarriage design (Fig. 95). Owing to the similarity of the Hochdorf pole and pole axle fittings, there is little doubt that the same kind of traction-rod was again used on this wagon.

Among the wagon finds from grave 2 at Apremont are some fragmentary fittings from the pole axle (Pl. 7, 7). These comprise a small axle-cap from the end of the pole axle, and remains of a ribbed iron cylindrical object. The ribbed cylindrical object must clearly be compared with the cylindrical heads of the traction-rods which flanked the base of the pole on the Hochdorf wagon and it is probable that a similar traction-rod construction was used on the Apremont wagon. Remains of the pole have again survived from the wagon from Sainte-Colombe, 'La Butte' (Pl. 16, 13.15). This pole had a 'D'-shaped cross-section and was apparently completely covered with undecorated iron sheet. The base of the pole terminated in a 'T'-shape and obviously fitted on a small axle, from which one small iron axle-cap is preserved (Pl. 16, 6). No traces of traction-rods have survived from this wagon, but it is not improbable that they were originally present and may have been similar to those from Hochdorf and Apremont.

Small axle-caps, undoubtedly from pole axles, have survived from a further three wagons (see Ch. 6.2.1): Apremont grave 1 (Pl. 6B, 3), Vix (Pl. 21, 7), and Wohlen (Fig. 72, 16). It is uncertain whether these wagons had the same sort of undercarriage as Hochdorf, but it is by no means unlikely. The same question can be posed for the small axle-caps of the Urnfield period from Hart a. d. Alz (Müller-Karpe 1956, 64, fig. 6, 3), Skjerne (Fig. 32, 1) and Rohov (Jacob-Friesen 1969, 124, fig. 2, centre). In the well-known wagon-grave from Hart a. d. Alz, the excavators found the remains of three large axle-caps and one small axle-cap. Although Müller-Karpe suggested the possibility that the small axle-cap came from a model wagon, there can now be little doubt that it was fitted to the end of the wagon's pole axle. Clearly, the pole on the wagon from Hart a. d. Alz could therefore move in a vertical direction. It is not known whether it had a pivoted front axle, like Apremont and Hochdorf, but it is a distinct possibility that this technique of wagon construction was already applied in the Urnfield period (see Ch. 3.8).

It seems certain that the wagons from Apremont grave 2 and Hochdorf had pivoted front axles. Both these wagons belong to type 7, as do the four other wagons on which the pole fittings or pole axle-caps make a pivoted front axle plausible. But pivoted front axles may also be indicated for the wagons of types 4, 5 and 6 from Ohnenheim, Hohmichele grave VI, and Chouilly, 'Les Jogasses', grave 16, and the wagon from Vix.

We are fortunate that the Ohnenheim wagon fittings were expertly restored by the Römisch-Germanisches Zentralmuseum, Mainz, and reconstructed by Dr M. Egg. Dr Egg's results have been published in detail (Egg 1987a), and only a brief summary is offered here. The Ohnenheim wagon had a number of cast bronze socketed components which must have fitted on a small axle of 23 to 25 mm diameter (Pls 12-13; 14, 4-5). Two of the

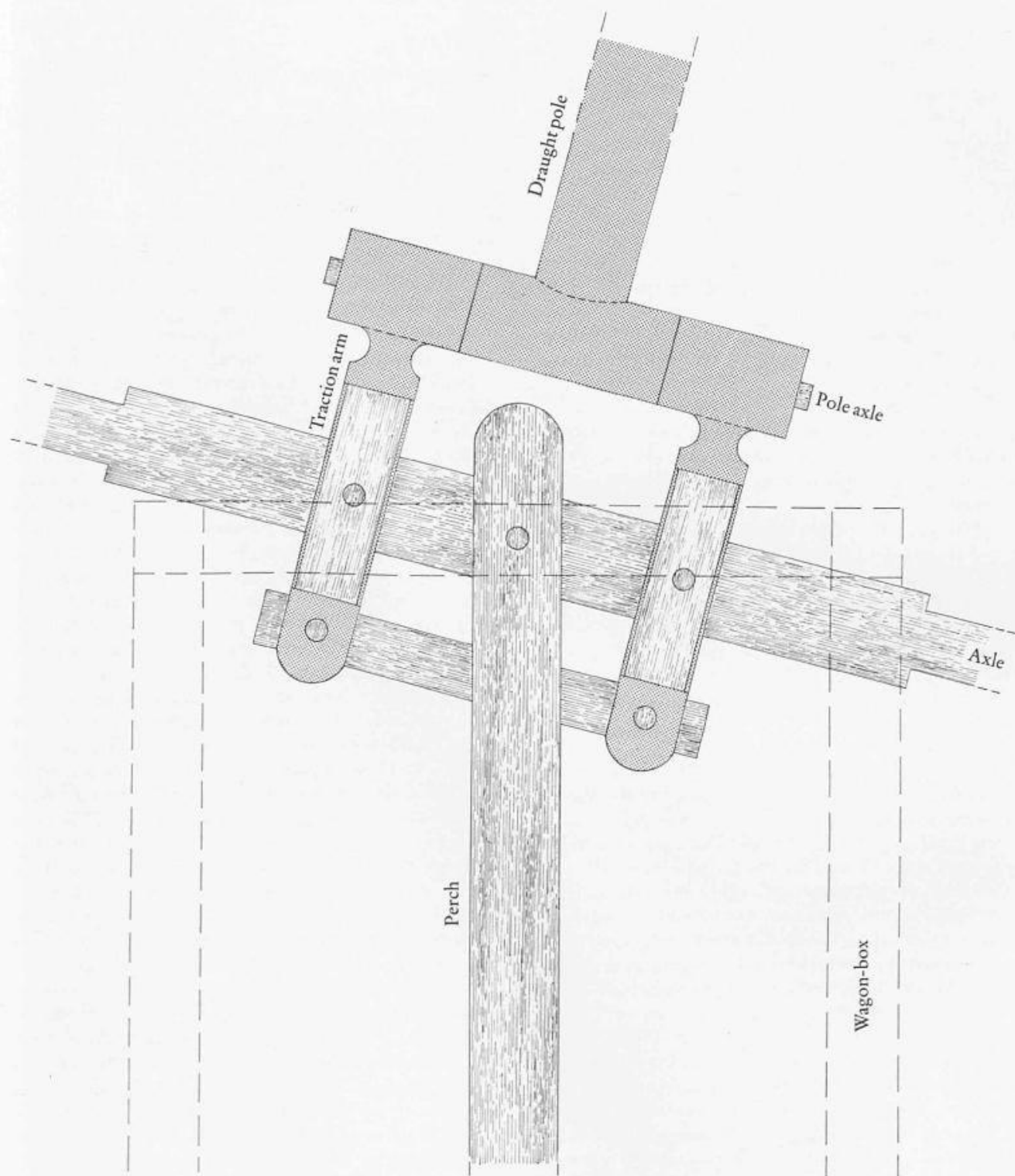


Fig. 95 Como-Ca' Morta, wagon-grave of 1928: reconstruction of the traction-arm construction of the front axle (the bronze fittings are stippled).

fittings comprise heavy cylinders 162–166 mm in length, from one side of which projects a rectangular socket (Pl. 13). Another pair of fittings have one end formed by a pointed beak and the other formed by a round socket (Pl. 12). The other components are represented by two fragments (a rectangular socket and the circular opening for an axle), the complete original forms of which cannot be reconstructed (Pl. 14, 4–5). These fittings all seem to have functioned on the pole axle and, in his study of the Ohnenheim wagon, M. Egg offered a reconstruction of the Ohnenheim pole axle, following the design of Dejbjerg, Como-Ca' Morta and Hochdorf (Egg 1987a, 88, fig. 10). Accordingly, the Ohnenheim wagon had a pivoted front axle.

Dr Egg also offered a reconstruction of the Vix wagon (Egg and France-Lanord 1987). In this context it is the pair of small axle-caps (Pl. 21, 7) and the bronze sheet rings with the same diameter which are of interest (Pl. 21, 9–11). Presumably the bronze rings were fitted to the axle articulating the draught pole which, like those from Hochdorf and Ca' Morta, must again have been cylindrical in shape. Egg suggested that the Vix wagon also had wooden traction-rods, leading from the pole axle and fastened to the front axle of the wagon by the iron bolts still preserved on the bronze sheet axle fittings (Pl. 22, 1). According to Egg's reconstruction, the Vix wagon also had a pivoted front axle.

The wagon from Hohmichele grave VI had no pole fittings, but the excavators were able to uncover remains of the front axle which had a central perforation and an iron kingpin. The kingpin was 208 mm long with a square cross-section, and the upper end was terminated with a loop (Riek and Hundt 1962, pl. 3, 26). An iron kingpin also seems to have been used on the wagon from Chouilly, 'Les Jogasses' (Fig. 157). It is interesting to compare the Ohnenheim and type 7 wagons – which had rich metal pole and pole axle fittings but no iron kingpins – with those from the Hohmichele and Chouilly, 'Les Jogasses', which had iron kingpins but no metallic pole fittings. We may conclude that neither metallic pole nor pole axle fittings, nor iron kingpins were necessary for a wagon with a pivoted front axle. It is therefore possible that many other wagons had pivoted front axles, but with the component parts all made of wood. On the other hand, it is impossible to judge how many of our wagons had fixed front axles, because no characteristic metal fittings would be necessary for this simple type of construction.

Professor Piggott gave a succinct account of the problem of the pivoted front axle (1983, 156–8). He suggested that on a wagon with a pivoted front axle it would not be necessary to raise the box above the level of the wheels, even though the movement of the front wheels would be limited by the straight sides of the wagon-box. He calculated that if the Hohmichele wagon had a low box and pivoted front axle, the angle of turn would be 20°, giving a turning circle of about 8.5 m. It appears from Piggott's results that such a wagon would be sufficiently manoeuvrable and it would not be necessary to raise the box above the level of the axles. For example the Hohmichele wagon, with a turning circle of 8.5 m, would

be able to negotiate the sharp curve of the east entrance (*Donautor*) of the Heuneburg, where wheel ruts are attested in periods IVb to IIIa (Gersbach 1976, Beilage 2). Biel published similar results for the Hochdorf wagon, with an angle of turn of 20° and a turning circle of less than 10 m (Biel 1987, 127).

9.5 IRON UNDERCARRIAGE FITTINGS

The study of the undercarriage of Hallstatt period wagons must take account of the iron perch fittings from Vix and Bell (Egg and France-Lanord 1987; Joachim 1987).

The Vix wagon had an iron object affixed to the top of the wooden perch (Pl. 22, 7). It was 1.35 m long with a thick rectangular cross-section, and curved upwards at both ends. The box of the Vix wagon was, therefore, obviously raised above the level of the undercarriage, and M. Egg suggested that the box was supported by the four bent iron rods found among the wagon fittings (Pl. 22, 3–6; Fig. 162, 20). If Egg is correct, then the base of the box would have been raised about 230 mm above the undercarriage. Although one must agree with Egg that the box was raised, his interpretation of the iron rods is open to question. The rods are 313 mm long, with a 40 mm long rectangular tongue at both ends (Pl. 22, 3–6), and are formally related to the curved rods from Grandvillars and Sainte-Colombe, 'La Garenne'. There were two pairs of rods from the 'La Garenne' tumulus, measuring 490–530 mm in length; one pair was bent into a sinuous shape, the other into a simple arched form (Pl. 17). There were also two pairs from Grandvillars, measuring 415–457 mm in length, one pair being straight, the other pair being curved (Pl. 9B, 2.4–5). In all three graves there were four rods and in every case the ends were thickened before terminating in a rectangular tongue. The Grandvillars rods differ only slightly, one end having a rectangular tongue and the other having a simple point. It is difficult to believe that the rods were only formally related; they are so similar that a functional relationship is very probable. If so, then it is unlikely that the Vix rods could have stood vertically as supports of the box, because that function would have been quite unsuitable for the Grandvillars and 'La Garenne' rods. The author is forced to admit, however, that the function of the rods on all three wagons remains uncertain.

On the wagon from Bell there was a 'Y'-shaped arrangement of iron rods attached to the top of the wooden perch (Joachim 1987, 136, fig. 1, 8). Apart from the 'Y'-shaped attachment, the Bell wagon also had four iron rods, each with a loop at both ends (Joachim 1987, 136, fig. 1, 7). Looped iron rods have also been found in the wagon-grave from Repperndorf (Pl. 81, 2–5). The rods clearly seem to be related to the looped iron rods found in chariot-graves of the La Tène period. These have been collected in a list and illustrated by A. Haffner and H.-E. Joachim (1984, 79, fig. 8; 80, fig. 9). The rods from Mirkovice and Sedlec-Hůrka grave 44 should be added to Haffner's and Joachim's list. The Mirkovice example is 490 mm long and is housed in the Hanspaulka Museum,

Prague (inv. no. 3396); the Sedlec-Hůrka rod measures ca. 420 mm in length and is in the Západočeské Museum, Plzeň (inv. no. 10118) – for the other finds from these two graves, see Soudská 1976. Two interpretations have been offered for the looped rods. They may have played a rôle in the traction or steering of the vehicle, perhaps being attached between the axle and a crossbar (splinter-bar or *Sprengwaage*), from which traces would run to the horse-harness (e.g. Günther 1934, 9, fig. 1; Piggott 1983, 211). Or the rods could have functioned as supports for the chariot-box, as Rest, Haffner and Joachim have suggested (Rest 1948, 144, fig. 9; pl. 27; Haffner 1983; Haffner & Joachim 1984; Joachim 1987, 138–9, figs 3–4). The former proposition is now untenable, not only for wagons but also for chariots, in view of the fact that looped rods could be used at both ends of four-wheeled wagons and were provided in sets of four on the wagons from Bell and probably Repperndorf.

Owing to the variation in size of the looped iron rods, it is certain that they were not all attached to wagon-boxes in the same way. Thus while the longer rods could have fitted between the pole and the top of the box, the other examples would have been too short. Haffner illustrates one possibility for the use of the shorter looped rods, attachment between the axle and box, on his reconstruction of the chariot from Bescheid tumulus 6 (1983, 245, fig. 12). A similar use has been suggested by Joachim for the iron rods on the late Hallstatt wagon from Bell (1987, 138–9, figs 3–4) and the same could be posited for Repperndorf. It is an open question whether the function of these rods bears any relation to the bent rods from Vix, Sainte-Colombe, 'La Garenne' and Grandvillars.

9.6 WHEEL GAUGE AND WHEEL BASE

The most important dimensions, the wheel gauge (distance between the wheels) and the wheel base (distance between the axles), are known from only 18 wagons. All the wagons have a gauge between 1.10 and 1.30 m except for Wehringen, 'Hexenberg', tumulus 8 with a gauge of 1.40 m, and Vix with an estimated gauge of 0.90 m. The norm for the four-wheeled wagons, 1.10–1.30 m, differs little from measurements of the five two-wheeled vehicles where the gauge is known (cat. nos 40A: 1.35 m; 40B: 1.35 m; 43: 1.29 m; 114B: 1.10 m; 154: 1.16 m). The wheel bases of the wagons also make a rather uniform picture, varying from 1.40 to 1.90 m, with the only exception being the type 1 wagon from Wehringen. An impression of the basic dimensions of 13 well-documented wagons can be gained from Fig. 96.

Wehringen is the only wagon which falls outside the norms both of the wheel base and gauge. In fact the wagon is quite exceptional, because its wheel gauge is wider than the length of the wheel base (Fig. 200). The exact size of the wagon-box is not known but, at least according to the position on the grave plan of the box fittings, it does not seem to have been longer than the wheel base. With a wheel gauge of 1.40 m and a wheel base of 1.10 m, and taking into account the length of the

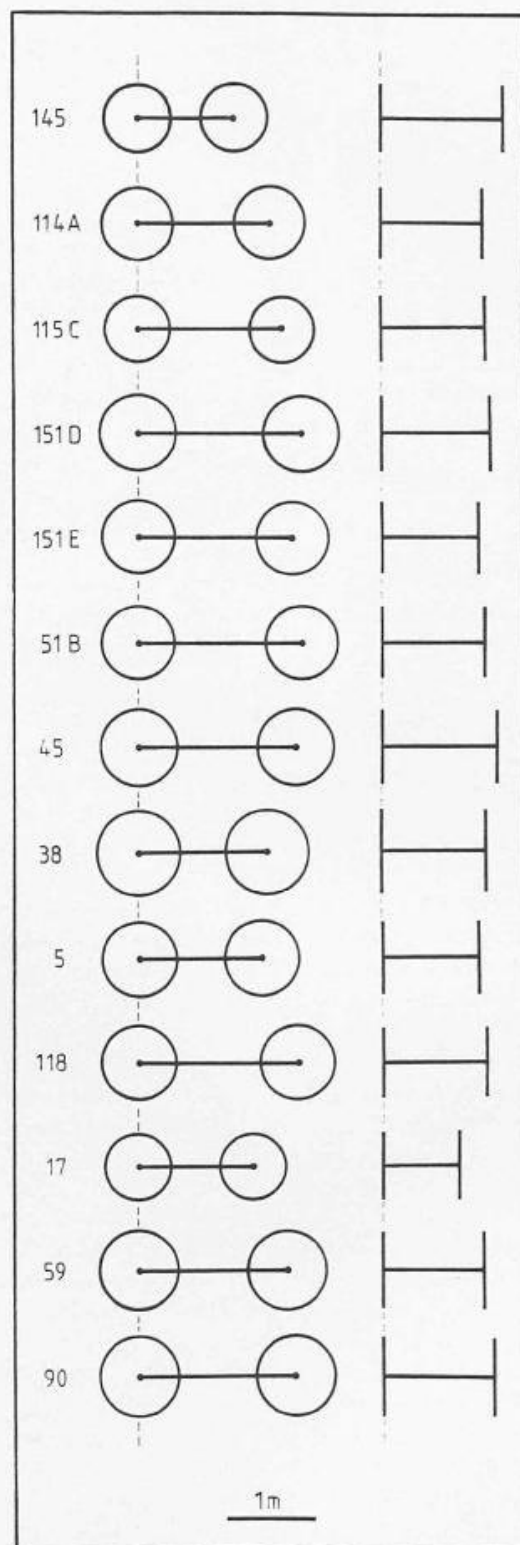


Fig. 96 Diagram of the wheel gauges and wheel bases of Hallstatt wagons (the numbers refer to the catalogue).

naves, the box must therefore have been almost square in shape (perhaps 1.00 × 1.10 m). Estimates of the wheel gauge and wheel base of Hallstatt wagons are given in the following table:

<i>Wagon</i>	<i>Wheel gauge (m)</i>	<i>Wheel base (m)</i>
Chouilly	1.10	1.40
Vix	ca.0.90	1.50
Bell	1.20	1.48
Offenbach-Rumpenheim	1.30	1.80
Hohmichele I	1.10–1.15	1.80–1.90
Hohmichele VI	ca.1.18	ca.1.80–1.90
Hochdorf	1.13	1.71
Bad Cannstatt	1.25	1.80
Augsburg-Kriegshaber	–	1.90
Dietfurt	1.10	–
Großleibstadt I/1	1.16	1.50
Großleibstadt II/14	1.20	ca.1.65
Hilpoltstein-Weinsfeld	ca.1.17	1.80
Leipheim	–	ca.1.50
Wehringen, tumulus 8	1.40	1.10
Hradenín, grave 24	ca.1.22	1.86
Hradenín, grave 28	1.10	1.76
Hradenín, grave 46	ca.1.26	–

9.7 THE WAGON-BOX

Apart from Wehringen, the wagons of the Hallstatt period seem to have had long rectangular boxes. According to the position of box fittings on grave plans, the wagon-boxes were never longer than the wagons' wheel bases. From the few wagons where information is available, it seems that the rectangular boxes measured between 585 and 840 mm in width and between 1.48 and 1.85 m in length, generally about twice as long as they were wide.

The sides of the boxes were low, apparently in no case exceeding 150 mm in height. On the metal-clad boxes from Hochdorf, Býčí-skála and Bad Cannstatt, the sides were respectively 85, 110 and 143 mm high. The wagon from Bell seems to have had sides 140 mm high. The decorated bronze sheet from Demmelsdorf indicates a wagon-box at least 110 mm in height (Pl. 88A, 6), and the maximum height of the decorative plaques from the sides of the Ohnenheim box was 100 mm. The oak balusters from the Magdalenenberg were 115–145 mm long and, if they belonged to the wagon-box, the sides would not necessarily have been over 150 mm high. As for the Vix wagon, the bronze frame on the southern end of the box, with a height of 184 mm, may give the original height of the box (Pl. 23, 1.2.4). The type 2 wagon from Neu Euting also seems to have had low wagon-box sides, according to the plan perhaps as little as ca. 80 mm in height (Fig. 197). Wamser reconstructed the Repperndorf wagon-box with sides 140 mm high. The box was decorated with two levels of zig-zag and grid-shaped decoration, which give a minimum height of 94 mm for the sides (Pl. 81, 13.22–26.29–30). However, the position of the box decoration on the grave floor (Figs 191–2) might indicate

that the sides were a little higher, perhaps as much as 200 mm high.

On four wagons it is probable that the floor of the box was made of wooden planks. In the grave of Bell, traces of the floor of the wagon-box were found on the iron perch attachment (Rest 1948, 139, fig. 4). The traces of wood showed five transverse planks, measuring about 100 mm in width, bearing the floor of the box, which was made from three long planks, each about 200 mm in width. According to the excavator, F. Dvořák, the floor of the wagon from Hradenín grave 28 was also made from three planks, in this case 18–20 mm thick and 300–350 mm wide. And the wagon from Hradenín grave 46 apparently had a box with a floor made of planks 22–24 mm thick. In grave VI from the Hohmichele, the excavators found planks 20–30 mm thick, which may also have come from the floor of the box. By contrast, the box of the wagon from Hochdorf had a floor made of thin ash rods, not more than a few centimetres in diameter, which were set longitudinally, and woven together either with leather or with thin wooden branches.

Although it appears generally to have been the case that our wagons had boxes with low sides, on some wagons the rule seems to have been broken: especially the wagons of type 2 which had an elaborate construction at the rear end of the box. On the wagon from Mitterkirchen, tumulus X, grave 1, this was composed of three levels of openwork bronze plaques alternating with pieces of wood covered with bronze decoration, and reached a height of at least 310 mm (Fig. 73, 2). The excavator, M. Pertlwieser, would prefer to interpret the construction as a chair or throne. However, since the work of M. Egg and the staff of the Römisch-Germanisches Zentralmuseum, Mainz, showing that there was no throne on the Ohnenheim wagon, there seems little reason to suggest a throne in the case of Mitterkirchen. Instead, the construction could have formed the highly-decorated rear side of the wagon-box. This also seems likely for the wagon from Neu Euting, where the wooden planks decorated with openwork bronze plaques could hardly be interpreted as a throne, but instead seem to form the rear end of the box (Fig. 197, 'A-B'). Owing to the lack of well excavated graves, information is lacking about the rear sides of the boxes of type 4 wagons. However, the tradition of an elaborate rear end may have been continued on wagons of type 5 with the disc-headed sockets, ribbed half-cylinders and heavily-profiled spools of box type iv. Indeed, the richly-decorated southern end of the box from Vix may represent the latest representative of the tradition. Whether the tradition can be followed back to the type 1 wagons is uncertain. However, the type 1 wagon from Wehringen, 'Hexenberg', tumulus 8 seems to have carried a complex construction on the rear end of its box, composed of pieces of wood covered with bronze sheet, and bipartite ornamental discs with openwork decoration (Pl. 96, 11–17; Fig. 202).

There appears to have been a tradition of Early Iron Age wagon construction in which the rear end of the wagon-box was richly decorated. On type 2 wagons, it seems that the rear end of the box was also higher than the

other sides. Whether this type of wagon design can be traced from the start (wagon type 1) to the end (Vix) of the Hallstatt period is questionable, and it is not certain if the low boxes (e.g. Hochdorf, Bad Cannstatt) constituted a separate contemporary tradition.

9.8 TWO-WHEELED VEHICLES

Two-wheeled vehicles have been found in at most five graves of the Hallstatt period. The vehicle from Großesbstadt, cemetery I, grave 4 is truly exceptional. It seems most probable that the vehicle was a two-wheeled cart with small wheels and a long narrow body (Fig. 186, 2). This sort of vehicle is unparalleled in the Hallstatt period and it is probable that it was a simple funerary cart specially made for this burial.

The other four graves with two-wheeled vehicles belong to the end of the Hallstatt period and anticipate the later practice of chariot burial. In fact, the graves come from the Middle Rhine area where chariot burial was also known in the early La Tène period: Hundheim tumulus 1 and tumulus 2, grave 1; Oberlahnstein; probably Schwalbach tumulus 1. However, it is often difficult to date these late graves with any precision, their poor grave-goods give them a rather problematical position (see Ch. 10.3.6; N.B. the grave from Manětín-Hrádek probably already belongs to the early La Tène period).

Reports of older excavations often claim to have found two-wheeled chariots, but a critical reading of the reports in the light of modern research makes the claims unlikely (for example Straškov tumulus of 1911; Uffing tumulus 1; Ursensollen-Erlheim).

9.9 CONCLUSIONS

The most important characteristic of the Hallstatt wagons, their four wheels, shows them to belong to a tradition rooted in the Urnfield period. Although the wagon-makers of the Hallstatt period adopted certain technological advances from Central Italy, an area mainly characterised by the two-wheeled chariot, they remained faithful to the four-wheeled wagon.

Perhaps the most impressive feature of our wagons is

the care spent in their construction. Both the wheels and wagon-box were often provided with metal fittings. Furthermore the wheels show how readily technological advances were adopted and quickly developed. Examples include the composite Großesbstadt felloe construction, the single-piece bent Gottesberg felloe construction and the hammer-welded iron tyre. The fast technological development evident from Hallstatt wagons indicates that they had an important and probably strenuous function: details of the draught pole and undercarriage, particularly the pivoted front axles on some wagons, represent practical technical solutions and imply an efficient and functional construction.

These lively technological developments on ceremonial wagons took place alongside a second tradition in wagon construction which produced purely functional vehicles, for example for use in agriculture. Although it certainly existed, evidence for this tradition of functional vehicles is almost completely absent from the archaeological record in the Hallstatt period. Obviously the functional, agricultural vehicles were not provided with elaborate metallic furnishings: these were reserved for the ceremonial wagons, which must therefore have been particularly important for their owners. Perhaps the workshops which made our ceremonial wagons also made elaborate two-wheeled vehicles and even chariots. However if chariots were produced, which would surely have played a multifarious rôle in social life, one would expect traces in the archaeological record, for example pictorial representations. But depictions of chariots are almost completely absent in Central Europe till the end of the Hallstatt period (Fig. 141).

Signs of wear are, not surprisingly, not preserved on the iron wagon fittings, but some bronze components, such as the axle-caps and linchpins from Wijchen, indicate long and strenuous use. The replaced felloe planks of the bronze wheels from La Côte-Saint-André suggest the same interpretation (Chapotat 1962, 41).

All these factors are of interest for our understanding of the Hallstatt wagon: they argue against an interpretation as pure funerary hearses and certainly show that the wagons were not made specially for the burial. Instead a ceremonial function seems most probable – their small size and simple wagon-boxes preclude an interpretation as vehicles for travel and transport over long distances.

The Chronology of the Wagon-Graves of the Hallstatt Period

10.1 THE EARLIEST WAGONS AND HORSE-GEAR OF THE HALLSTATT PERIOD

The wagons of type 1 have already been discussed in detail in chapters 3 and 8 ('Bad Homburg group'). It was explained that their fittings are known chiefly from hoards of the late Urnfield period. There is little doubt about the chronological position of the hoards, which are characterised by multifarious links with the supra-regional phase Ha B3 and by a complete lack of objects typical of the subsequent Hallstatt period. The wagon with fittings of this type from Wehringen, 'Hexenberg', tumulus 8 is the notable exception, not only being the only wagon of type 1 dated to the Hallstatt period, but also being the only one deposited in a grave. The 'transitional' find from Wehringen, with a wagon of Urnfield type in a Hallstatt grave, therefore represents secure evidence for the continuity of the Central European ceremonial wagon from the Urnfield to the Hallstatt period. Further evidence for continuity is provided by the four wheels of the Coulon group from the Early Iron Age tumulus of La Côte-Saint-André (and note the dendrochronological date for these wheels, 745–735, which seems to antedate the start of Ha C1; see Bocquet 1990, 36f.).¹

Although one must accept a local origin for the Hallstatt wagons, it is nevertheless remarkable that, apart from the wagons from Wehringen and La Côte-Saint-André, the Hallstatt wagons were provided with fittings considerably different from those of the Urnfield period, often betraying clear signs of influence from Central Italy. A comparison of wagon types 1 and 3 makes this very clear. Just as the wagons indicate the sudden adoption of technological advances in Ha C, we are able to recognise contemporaneously a fundamental change in horse harness (Kossack 1954a). In Ha C1 a range of new bronze harness and yoke fittings came into use (Fig. 100). Some of the fittings were developed in the Carpathian Basin and then adopted in the area north of the Alps (Figs 100, 3–5; 101, a–b). The prototypes for these fittings reached the

Carpathian Basin from the Pontic-Caucasian area in the 9th and 8th centuries BC. The other types of horse-gear were developed north of the Alps: some betray steppe influence (Figs 100, 1–2.6–7; 101, a–b) others, particularly the yoke fittings, were local inventions (Figs 100, 8–15; 101, c–d). These graves with novel types of rich horse-gear (Figs 100; 101) and iron wagon fittings represent important *Leitfunde* for G. Kossack's phase Ha C1. They evidence a horizon of exceptional cultural receptivity – in which influences both from the East and the South were accepted. The Wehringen grave, with its antiquated wagon and lack of iron objects, hardly seems to belong in this horizon. Indeed, there are indications which suggest a particularly early chronological position for this grave.

Apart from the wagon with its Urnfield parallels, the bronze sword of Gündlingen type also lends the Wehringen find an exceptional character among Hallstatt wagon-graves (Fig. 97; for the other grave goods see Figs 98–9). In 1959 G. Kossack drew attention to the fact that bronze swords were never found in wagon-graves of the Hallstatt period (1959, 124; also 1970, 121). The Wehringen grave, discovered subsequently, remains the only exception, even though Gündlingen swords are common in the area of wagon-grave distribution. Instead, 28 wagon-graves contain iron swords which, when typological attributes survive, can be assigned to the Mindelheim type.² The fact that Gündlingen swords were generally not deposited in wagon-graves and furthermore that in the single exception the wagon fittings were of the Bad Homburg type, appears highly significant and suggests a fundamental difference between the swords of Gündlingen and Mindelheim type. The most simple explanation is that Gündlingen swords were generally made and used earlier than the swords of Mindelheim type. The reasons for this chronological interpretation have been explained in an article by the author (Forthcoming 1).

For our purpose here, it is worth mentioning that Gündlingen swords are almost never associated with the rich horse-gear typical for Ha C1 (types: Fig. 100). An

¹ Chapotat 1962. The four bronze wheels of the Coulon group, which otherwise dates to the late Urnfield period, were associated in this tumulus with bronze vessels which are best dated to the older Hallstatt period. Parallels for the bronze situla date to the 7th century BC; see Ch. 3, note 5. But note that the dendrochronological date suggests an earlier position; see Bocquet 1990, 36f.

² Großebstadt, cemetery I, grave 1: Kossack 1970, pl. 32, 4; Hohenstein-Oberstetten tumulus 1: Pl. 37E, 1; Dýšina tumulus 2: Kříkava 1883, pl. 15, 40; Hradenín grave 24: Dvořák 1938b, 34, fig. 32, 1; Berghülen: Zürn 1961, pl. 12A, 1; Lhotka: Pl. 116B, 1; Breisach-Gündlingen: Pl. 32B, 2; Dolany: Pl. 107A, 3; Marainville-sur-Madon: Olivier 1988, 278, fig. 3; Ohnenheim: the sword probably had an ivory pommel, Egg 1987a, 77–9.

important exception comes from Plaňany grave 5 (Dvořák 1933); the only other exception is constituted by the pair of bronze cheek-pieces of Kossack's type Ib in grave 20 (Daněk) from Platěnice (Hralová 1965). In fact, if one studies the horse-gear associated with Gündlingen swords, it is very noticeable that it is quite different from the well-known Ha C1 sort. For example the horse bits are regularly made of bronze: the only exception comes from the above-mentioned Plaňany grave. Six graves can be listed:

- 1) Chavéria tumulus 16, dép. Jura: Vuaillet 1977, 97, fig. 62.
- 2) Kissing, Kreis Aichach-Friedberg: Schmitt 1985, 43, fig. 8, 13.
- 3) Litoměřice-jih, Weigendova pískovna, inhumation grave I, okr. Litoměřice: Zápotocký 1964, 164, fig. 7, 1.
- 4) Předměřice, okr. Hradec Králové: Werner 1961, 385, fig. 1, 4.
- 5) Platěnice, Daněk grave 20: Hralová 1965, 135, fig. 2, 3.
- 6) Velešice, okr. Jičín: Domečka 1923, 339, note 2; Novák 1975, 30, no. 184.

This is important for two reasons: firstly because bronze bits, compared with iron examples, are relatively rare in Ha C; secondly because the bronze bits from these six finds belong to an antiquated short variety without rein-rings.³ The iron or bronze bits associated with rich Ha C1 horse-gear, by contrast, are longer and have rein-rings (e.g. Fig. 100, 1).

While the short bronze bits associated with Gündlingen swords give grounds to suspect strong links with their Urnfield predecessors, this is specially obvious in the case of the horse-gear from Chavéria tumulus 16. The grave finds include not only a bronze Gündlingen sword with winged chape, but also two rod-shaped bits and four spectacle-shaped cheek-pieces which only find parallels in the Urnfield period (Hüttel 1981a, 150-4). The grave goods associated with the Gündlingen sword and bronze bit from Předměřice would also normally be dated in the Urnfield period: namely the pair of cheek-pieces of Kossack's type Ia and the bronze horse-head sceptre (a related sceptre in the hoard from Prügy was dated by T. Kemenczei to the 9th century BC: Kemenczei 1981, 29-41).

The horse-gear grave of 1894 from Velburg-Lengenfeld tumulus 1, with its pair of bronze bits without rein-rings and its four bronze cheek-pieces, should also be mentioned in this context (Torbrügge 1979, pls 70; 71, 9-14). As in the case of Chavéria and Předměřice, these cheek-pieces lack parallels in the Hallstatt period. Instead, related pieces are to be sought among late Urnfield examples (*Bügel-, Brillen-, Ösen-, Stangenknebel*: see Hüttel 1981a, pls 20-23). It is particularly important to note here that this grave may also have contained a Gündlingen sword, which is today housed in the Berlin Museum für

Ur- und Frühgeschichte (Torbrügge 1979, pl. 79, 20-21). Although the sword cannot be regarded as securely associated, it is quite possible that this grave *ensemble* represents a further association of antiquated horse-gear



Fig. 97 Bronze sword and chape from Wehringen, 'Hexenberg', tumulus 8 (photograph kindly supplied by G. Krahe, Augsburg). — Scale 1:5.

³ Compare Balkwill 1973, 425ff.; e.g. figs 5-6, nos 32-8. Further examples of these short bronze bits without rein-rings are known from: Oedheim, Kreis Heilbronn; Mönchsdeggingen-Ziswigen, Kreis Donau-Ries; Pullach, 'Nord', Kreis München, tumulus 1; 'Regensburg'; Platěnice, stray finds (two examples); Zaborowo, pow. Wolsztyński. For references, see Appendix.



Fig. 98 Pottery vessels and gold cup from Wehringen, 'Hexenberg', tumulus 8 (photograph kindly supplied by G. Krahe, Augsburg).

with a Gündlingen sword.⁴ Thus whereas Mindelheim swords were often associated with typical Ha C1 horse-gear and wagons with iron fittings, the horse-gear graves with Gündlingen swords described above seem to represent an earlier horizon.

In my opinion, the swords of Gündlingen type seem tendentially earlier than those of type Mindelheim. Because it is the latter which are associated with Kossack's Ha C1 phase, I suggest a horizon with Gündlingen swords at the very beginning of the Hallstatt period. But whether the horizon can be consolidated as a true chronological phase is doubtful, especially because of the insufficient quantity of find *ensembles* which can be assigned to it at present. Nevertheless, it seems justified to position these transitional *ensembles* at the start of the Hallstatt period – before Ha C1 and therefore in the 8th century BC. The warrior-grave from Tarquinia still seems the most reliable anchor for the absolute chronology of the start of Ha C1, and suggests a date for our 'transitional' graves before the last quarter of the 8th century BC.⁵

I have briefly introduced the concept of Ha C1 as a phase characterised by remarkable cultural receptivity. The most obvious novelties adopted in Ha C1 include new types of horse-gear and wagon fittings, and the widespread appearance north of the Alps of iron in graves. If

our hypothesis is correct, then the start of the Ha C1 phase should be understood as a relatively sudden cultural change. This stands in marked contrast to the 'transitional' graves discussed above, which are still marked by a preponderance of local and West European artefact types and a paucity of iron. Among other things it is interesting to note that one of the changes in Ha C1 was the introduction of larger bits, with an average width of 100 mm. As Kossack suggested, the Ha C1 bits indicate the introduction of a new, larger breed of horses, probably from the North Pontic steppes, whereas the late Urnfield bits and the bits associated with Gündlingen swords (average width 70 mm) were probably used for a smaller breed local to Central Europe (Kossack, 1988).

These considerations are important for our interpretation of the re-introduction of wagon burial, which since the older Urnfield period had been absent from the archaeological record for at least 300 years. These questions will be discussed below (Ch. 12). Here it need only be concluded that our chronological discussion (Pare, Forthcoming 1) has demonstrated that Wehringen, 'Hexenberg', tumulus 8 is the oldest wagon-grave of the Hallstatt period, and was succeeded by the iron-clad wagons of Ha C1, among which those of type 3 clearly show a dramatic break with Urnfield traditions.

⁴ The finds from Lengenfeld are stored under the inventory number 1898, IIc, 3665, a–p. Whereas IIc, 3665, a–k came from a 'länglicher Doppelhügel', and IIc, 3665, l from the saddle between the two tumuli, the finds IIc, 3665, m–p are supposed to come from a neighbouring tumulus. The finds IIc, 3665, a–k are particularly important, and certainly belong with the finds from the wagon-grave of 1870, which are now housed in the Städtisches Museum, Regensburg. But the same cannot apply for the bronze sword with chape which is also listed under IIc, 3665, a–k, because the Regensburg grave already has an iron sword and chape (Torbrügge 1979, pls 76, 2–3; 79, 20–21). The only other excavation of Hallstatt graves known to have taken place at Lengenfeld were those of J. Naue in 1893 (three tumuli) and 1894 (two tumuli). His 1894 excavations only uncovered pottery vessels. In the other 1894 excavations, one tumulus contained a female grave (Torbrügge 1979, pl. 72, 17–24: pins, arm-rings etc.), the other contained rich horse-gear, a fragmentary bronze vessel and painted pottery (ibid. 307–8; pls 70; 71, 9–14). The bronze Gündlingen sword certainly came from a grave because it survives with its chape – and most likely from the rich horse-gear grave 1 of 1894. G. Kossack came to the same conclusion concerning tumulus 1 of 1894 (Kossack 1954a, 151–2).

⁵ K. Kilian dated the grave to ca. 700 BC but an earlier date, in the last quarter of the 8th century, is now preferred by most authors: Kilian 1977, 95–8; Ström 1971, 141–5 ('last quarter of the 8th century'); Canciani 1974, 25 and pl. 18, 2 (725 BC).

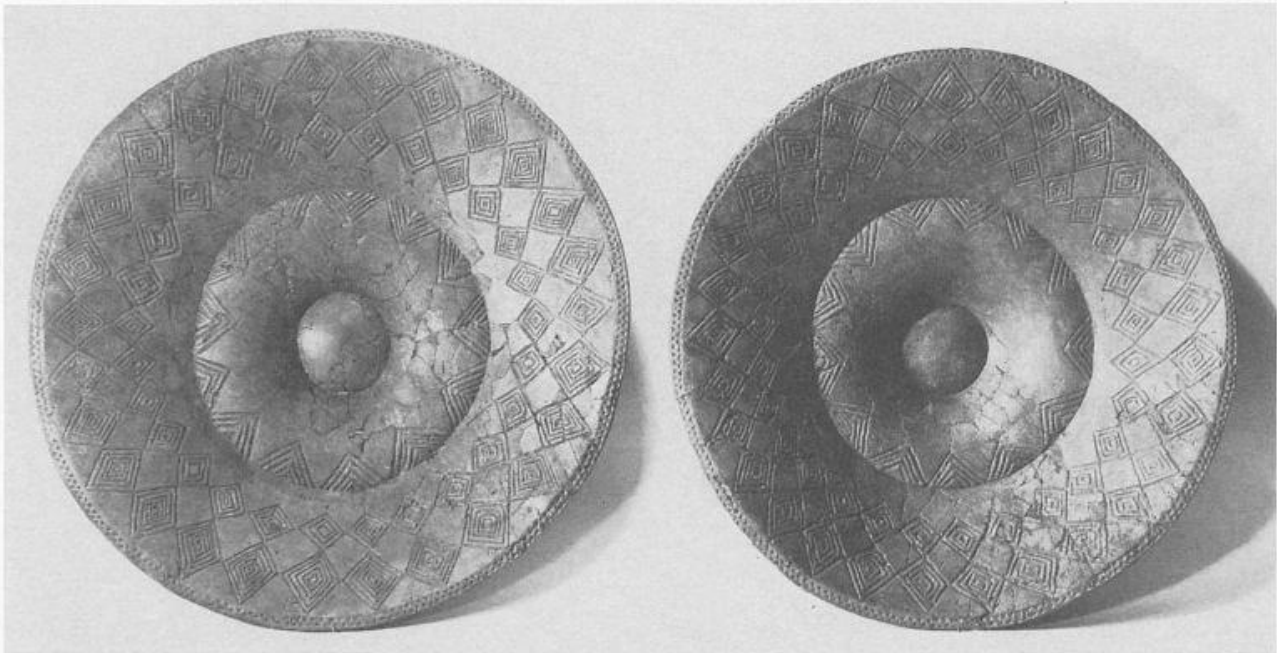


Fig. 99 Two pottery plates from Wehringen, 'Hexenbergle', tumulus 8 (photograph kindly supplied by G. Krahe, Augsburg). – Scale 1:7.

10.2 WAGONS AND HORSE-GEAR IN THE OLDER HALLSTATT PERIOD (HA C)

The most important studies of Ha C chronology were published by G. Kossack in 1957 and 1959; his chronological arguments were restated in a monograph of 1970 (1957a; 1959; 1970). Kossack's division of Ha C into an earlier (Ha C1) and later (Ha C2) part found general acceptance, although the precise definition of Ha C2 is today an object of considerable controversy. For the purpose of this work, however, it has not been possible to make use of a strict subdivision of the older Hallstatt period. This would require a detailed knowledge of pottery sequences, which is precluded by the poor quality of publication in most areas where wagon burial was practised. Indeed, owing to the large area under study and our limited understanding of pottery development, it has been necessary instead to rely heavily on metal objects for dating purposes. Metallic artefact types often attained a wide currency, enabling us to accommodate finds from different cultural groups in a uniform chronological framework.

10.2.1 Earlier graves in Ha C

In Kossack's chronological studies his discussion of the horse-gear of the older Hallstatt period is certainly relevant here, because harness equipment is so often found

in wagon-graves (Kossack 1954a; 1959, 17–24; 1970, 111–3). He concluded that the graves with 'rich horse-gear' are characteristic of the earlier part of Ha C (Ha C1). Among the classic South Bavarian graves of this type mentioned by Kossack are Mindelheim tumuli 7 and 11 and Maisach-Gernlinden (Kossack 1959, pls 20, 5–10; 21; 25–7; 60). The typical elements of such horse-gear are shown here on Fig. 100; the list of 'rich' horse trappings in the Appendix, and the distribution maps (Fig. 101, a–d) are based on Kossack's publication of 1954, with the addition of numerous new finds⁶ (ibid. 1954a). Kossack wrote that graves with more simple harness can also be dated to Ha C1 if they include typical elements of 'rich horse-gear' (1959, 19). He mentioned as examples the graves from Emmerting-Gendorf and Mindelheim tumulus 9 (ibid. 1959, pls 23, 4–11; 115, 2–3).

A glance at the list of these 'early' harness components (Appendix) shows that graves with several of the characteristic types of fittings are almost completely restricted to South Germany and Bohemia (Fig. 101). Otherwise the graves generally only contain a single type of fitting which had presumably been imitated or obtained from the central area of distribution. This is one reason for caution in the use of the 'early' harness fittings for chronological purposes, because in the peripheral areas they may have continued to be produced after they went out of fashion in South Germany and Bohemia. This certainly seems to be true in the case of the bronze bits and

⁶ Only the most typical elements of 'rich horse-gear' are listed in the Appendix. Note that only the bronze toggles (not the iron or bone examples) and indeed only the typical examples genuinely belonging to horse harness are included. Some of the toggles collected by C. Dobiat have been omitted from our list: they are smaller and belong to local variants (e.g. in Slovenia). They often seem to have been used as dress-fasteners and frequently date to a late part of the Hallstatt period (see Dobiat 1979).

hemispherical ring-footed rein-knobs from Wijchen (Pl. 5, 13–14.22–23), which were associated with wagon fittings with parallels in Ha C2 and D1 (compare Pl. 4 with the finds from Vilsingen: Zürn 1987, 178, fig. 76, 1–5). The same can be suggested for Slovenia where rein-knobs related to those in South Germany and Bohemia are found in graves of the Stična-Novo mesto horizon (see Appendix; e.g. the tripod grave from Novo mesto and the Stična graves). It should also be stressed that isolated elements of 'early' harness are occasionally found in later graves associated with completely new types of horse-gear; examples include the bronze toggles from Strettweg and warrior-grave B from Sesto-Calende (see Appendix). Bronze toggles were also occasionally used in the later Hallstatt period, probably as dress fasteners (e.g. Mahlsperren: Wagner 1908, 60, fig. 39, n; Villingen-Schwenningen, 'Magdalenenberg', grave 80: Spindler 1973, pl. 48, 4.8), and single components of 'early' horse-gear sometimes seem to have been deposited in later graves as pendants or amulets (see Appendix; e.g. Hemishofen; Dautmergen; the Hallstatt graves).

With these caveats in mind, much evidence supports Kossack's judgement of the 'early' harness fittings. I suspect that his use of the term 'rich horse-gear' was meant to emphasise that the employment of such horse-gear to define Ha C1 is only valid in the main area of its distribution (South Germany and Bohemia) while in peripheral areas, where only isolated elements of harness are represented, the horse-trappings could have remained in circulation till the end of Ha C or even later. It is clear from the Appendix that in South Germany and Bohemia the graves were often provided with whole sets of harness fittings, whereas in other areas the graves generally only contain an incomplete selection.

According to our discussion and bearing in mind the restrictions remarked on, we can affirm that the horse trappings illustrated on Fig. 100 can be used in South Germany and Bohemia, along with other types, to define Kossack's Ha C1. The validity of C1 as a distinct chronological phase has never been doubted; even authors who do not recognise the existence of Ha C2, such as M. Hoppe, K. Spindler and W. Torbrügge, use Kossack's Ha C1 to define their classic Ha C phase. The author's treatment of Wehringen, 'Hexenberg', tumulus 8 and related graves is the first attempt at a closer definition of Ha C1, with the suggestion that certain of the types included by Kossack should be assigned to a primary horizon in Ha C (before the appearance of Mindelheim swords and 'rich horse-gear'), in which late Urnfield traditions still played a considerable rôle (Pare, Forthcoming 1).

The inception of Ha C1 horse-gear is relatively easy to discern. Kossack demonstrated the derivation of many of the essential harness fittings from horse-gear of the 'Thracian-Cimmerian' complex (ibid. 1954a), and Ha C1 harness trappings are known from the warrior-grave in Tarquinia and the 'Tomba con Carrettino' in Como-Ca' Morta, in the former case dated before, in the latter case

dated in the decades around 700 BC.⁷ There is therefore little doubt about the early inception of Ha C1 harness, for which the Tarquinia grave provides a *terminus ante quem* in the last quarter of the 8th century BC.

The end of Ha C1 is more difficult to judge and will be discussed below, together with the problematical definition of Ha C2. Here it will suffice to note that these questions rely chiefly on an understanding of pottery development in Ha C. By contrast, the metal artefacts most commonly associated with Ha C1 horse-gear form a rather restricted range of types. In at least 45 male graves the horse-gear was associated with bronze or iron Hallstatt swords, almost always related to the Mindelheim type; furthermore bronze pins, toilet implements and bronze vessels are regularly attested. Although this remarkably uniform set of grave-goods may suggest a relatively distinct horizon of graves it must be emphasised that the individual types may often have continued in use till the end of the older Hallstatt period. This certainly seems true for iron swords, judging from the example apparently associated with an iron serpentine fibula in Prächting tumulus 58 (Abels 1978, 205–6) and the sword in the wagon-grave from Marainville-sur-Madon, dated to Ha D1.

Kossack gave a detailed account of the pottery associated with Ha C1 horse-gear in South Bavaria (for example Kossack 1959, pls 20, 5–10; 21; 22; 25–7; 60; 80); he was able to show that late forms are absent in these graves. In contrast graves with later Ha C pottery, often related in form or decoration to Ha D vessels, contain horse-gear lacking the elaborate fittings illustrated on Fig. 100. Thus we can summarise our discussion by affirming the validity of Kossack's Ha C1 phase and concluding that elements of the so-called 'rich horse-gear' on Fig. 100 represent important *Leitformen* for the relative chronology of Ha C.

Elements of 'rich horse-gear' are known from 27 wagon-graves. In 13 cases the wagons were of type 3, for example with type Breitenbrunn naves (wagon type 3a) from Beilngries, 'Im Ried-West', grave 74; Großebstadt, cemetery I, grave 1 and cemetery II, grave 14; Gehrsricht; Hradenín grave 46; and Straškov grave of 1911. Wagons of type 3b and 3c are associated with Ha C1 horse trappings in Wehringen, 'Hungerbrunnenmähder', tumulus 1 and Hradenín grave 24. These examples are sufficient to demonstrate the existence of wagon type 3 in an early or classic stage of Ha C.

But in some other wagon-graves hemispherical ring-footed rein-knobs represent the only elements of 'rich horse-gear'. The graves with type 3 wagons from Gündlingen, Tannheim tumulus VI and Leipheim could indicate that such harness-sets, solely comprising iron bits, hemispherical ring-footed knobs and small basket-shaped rein-knobs, could have continued into a later part of Ha C. The Gündlingen and Tannheim graves seem to include late objects, particularly the pottery in Tannheim tumulus VI (Geyr and Goessler 1910, pl. 3, 1.5) and the rein-ring from Gündlingen (compare Pl. 32B, 8 with Pl.

⁷ See Appendix. For the chronology of Como-Ca' Morta see Kossack 1957b, for Tarquinia see note 5.

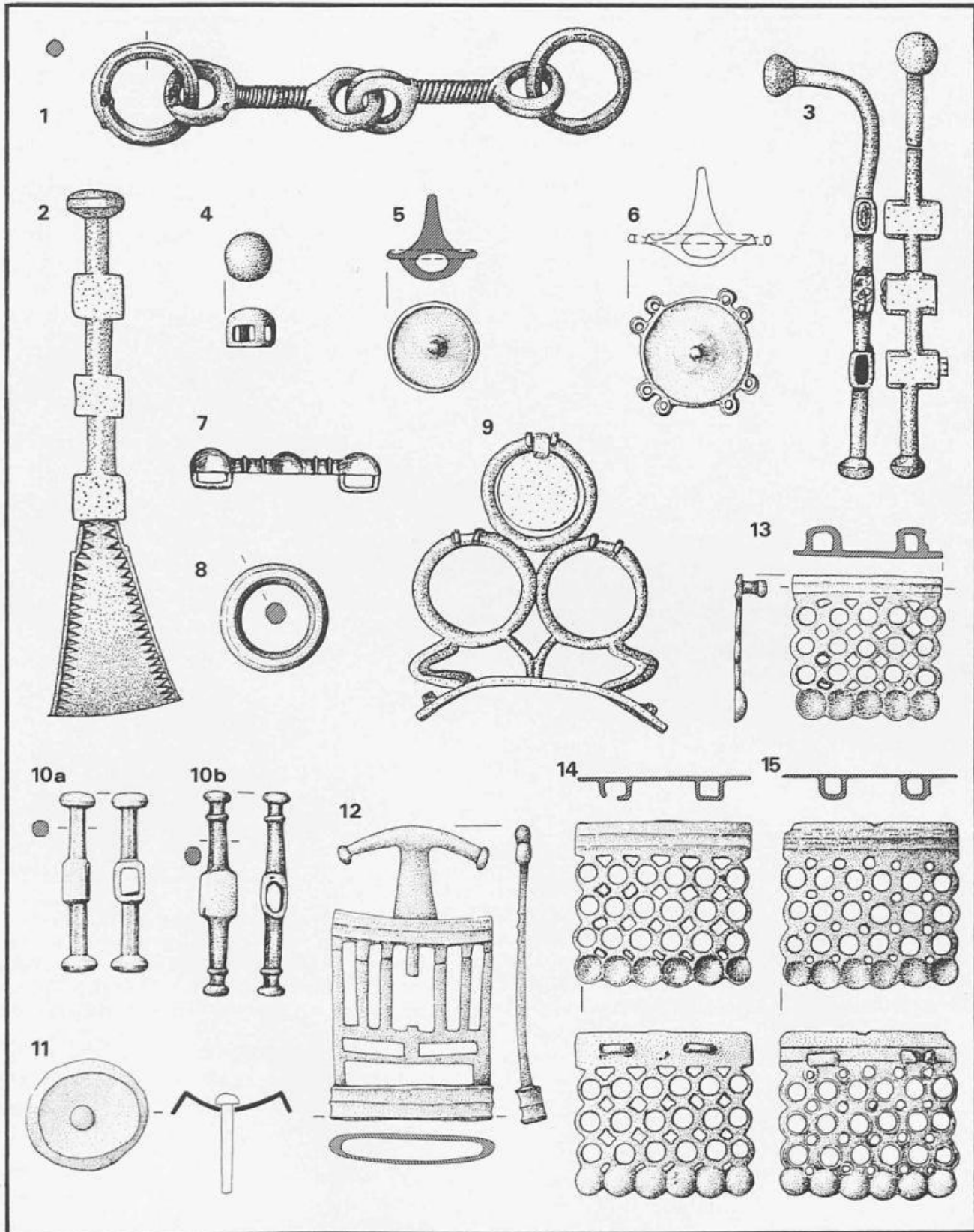


Fig. 100 The characteristic types of rich 'Ha CI' horse-gear (1-10.12-15 after: Grempler 1904; Kossack 1954a; Torbrügge 1965; *ibid.* 1979). - Scale 1:2.

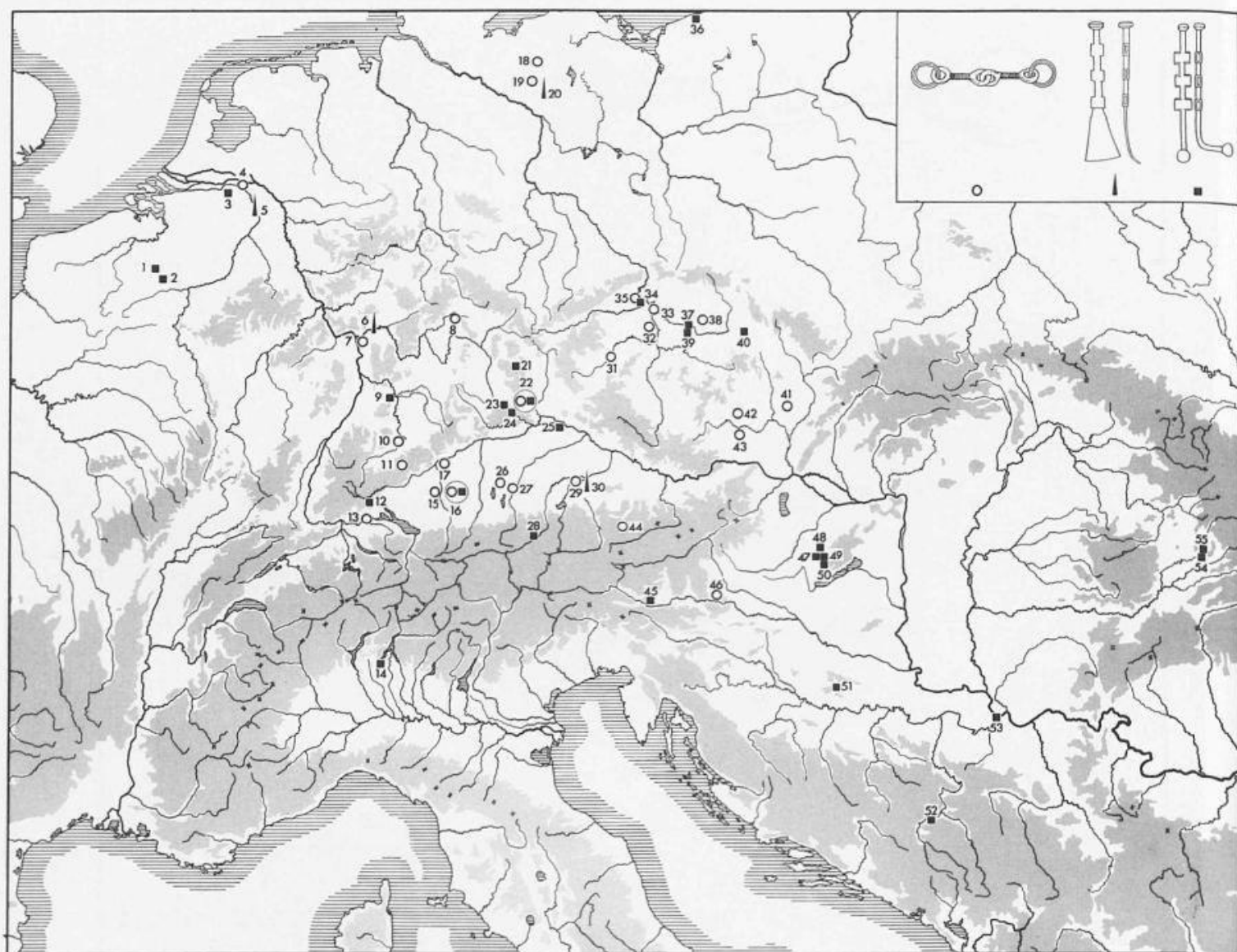


Fig. 101a The distribution of bronze horse bits with rein-rings (Fig. 100, 1), cheek-pieces of Kossack's type Ic (Fig. 100, 2), and cheek-pieces of Kossack's type Ib (Fig. 100, 3). For references, see Appendix. 1 Morimoine. - 2 Court-St.-Etienne. - 3 Oss. - 4 Wijchen. - 5 Meerlo. - 6 Frankfurt-Stadtwald. - 7 Bischofsheim. - 8 Großebstadt, cemetery I. - 9 Bad Rappenau. - 10 Köngen. - 11 Engstingen-Großengstingen. - 12 Bittelbrunn. - 13 Dörflingen. - 14 Como-Ca' Morta. - 15 Tannheim. - 16 Mindelheim. - 17 Oberfahlheim. - 18 Grebbin. - 19 Marnitz. - 20 Triglitz. - 21 Neukirchen-Gaisheim. - 22 Unterwiesacker. - 23 Thalmässing-Alfershausen. - 24 Beilngries. - 25 Aholting. - 26 Fürstfeldbruck. - 27 Pullach. - 28 Wörgl. - 29 Emmerting-Bruck. - 30 Gilgenberg. - 31 Dyšina. - 32 Tuhoměřice. - 33 Straškov-Račíněves. - 34 Lovosice. - 35 Lhotka. - 36 Stęszczyce. - 37 Opatowitz. - 38 Kolaje-Račany. - 39 Hradenín. - 40 Platěnice. - 41 Bošovice. - 42 Stupešice. - 43 Retz. - 44 Hallstatt. - 45 Frög. - 46 Kleinklein. - 47 Somlyóhegy. - 48 Nagysomló-Dobai. - 49 Sédvitz. - 50 Somlóvásárhely. - 51 Kaptol. - 52 Boranja. - 53 Ritopek. - 54 Cristești. - 55 Cipău.

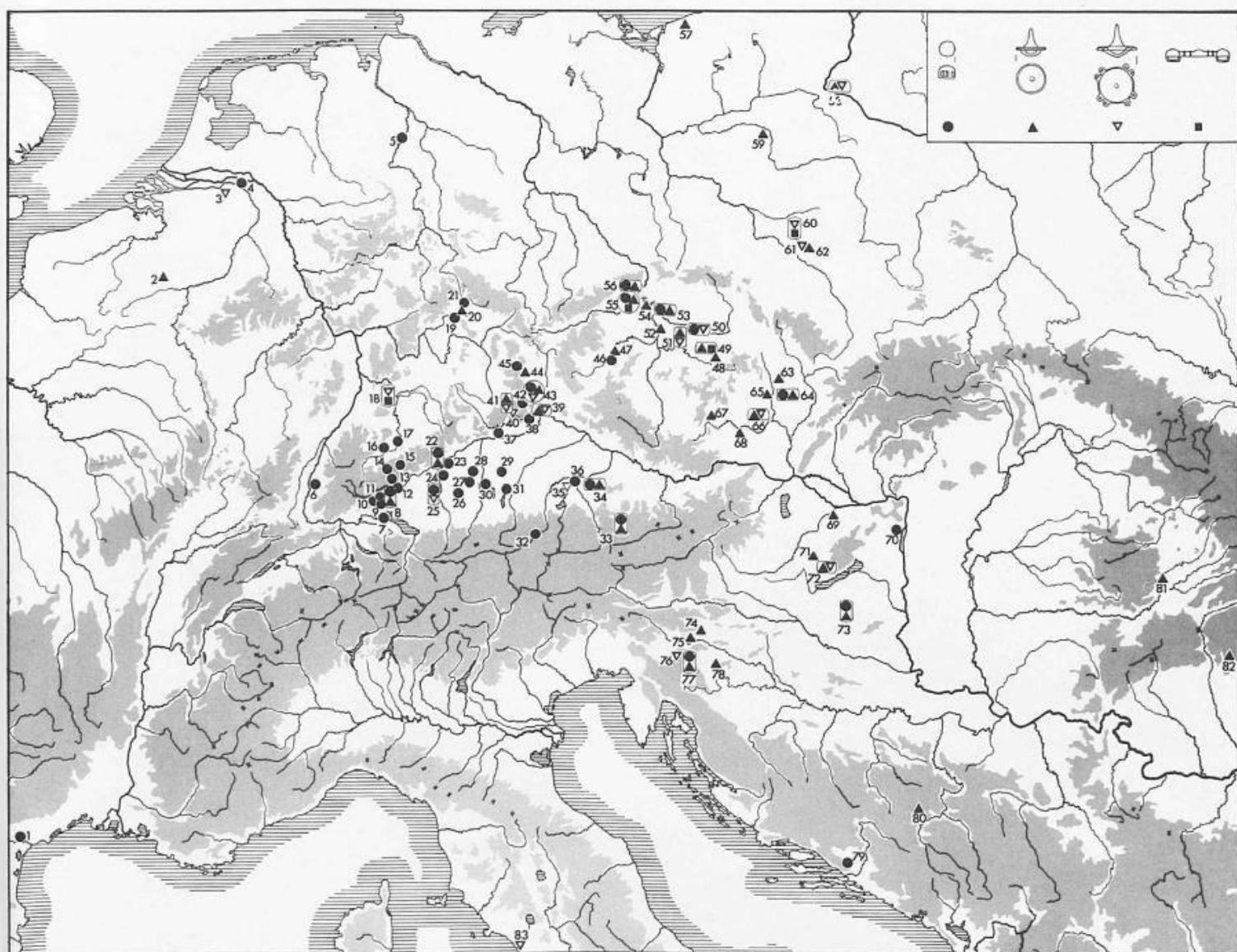


Fig. 101b The distribution of hemispherical ring-footed rein-knobs (Fig. 100, 4), tutulus shaped rein-knobs (Fig. 100, 5), tutulus shaped rein-knobs with loop decoration (Fig. 100, 6) and double rein-knobs (Fig. 100, 7). For references, see Appendix. 1 Mailhac. - 2 Court-St.-Etienne. - 3 Oss. - 4 Wijchen. - 5 Estorf-Leeseringen. - 6 Breisach-Gündlingen. - 7 Reichenau. - 8 Buchheim, 'Wolfegg'hof. - 9 Eigellingen-Honstetten. - 10 Bittelbrunn. - 11 Rorgenwies. - 12 Sigmaringen-Laiz. - 13 Albstadt-Ebingen, 'Im Rauenwiesle'. - 14 Albstadt-Tailfingen. - 15 Engstingen-Großengstingen. - 16 Neustetten-Wolfenhausen. - 17 Köngen. - 18 Bad Rappenau. - 19 Großenstadt, cemetery I. - 20 Großenstadt, cemetery II. - 21 Forst Merzelbach. - 22 Oberfahlheim. - 23 Leipheim. - 24 Vöhringen. - 25 Tannheim. - 26 Mindelheim. - 27 Lager Lechfeld. - 28 Wehringen. - 29 Maisach-Gernlinden. - 30 Scheuring-Haltenberg. - 31 Gauting. - 32 Wörl. - 33 Hallstatt. - 34 Gilgenberg. - 35 Emmerting-Gendorf. - 36 Emmerting-Bruck. - 37 Moritzbrunn. - 38 Riedenburg-Haidhof. - 39 Beratzhausen. - 40 Beilngries. - 41 Thalmässing-Alfershausen. - 42 Thann-Neuhaus. - 43 Unterwiesnacker. - 44 Illschwang-Gehrsricht. - 45 Neukirchen-Gaisheim. - 46 Dyšina. - 47 Kyšice. - 48 Žleby. - 49 Hradenín. - 50 Plaňany. - 51 Bylany. - 52 Praha-Střešovice. - 53 Straškov-Račíněves. - 54 Budyně nad Ohří. - 55 Lovosice. - 56 Lhotka. - 57 Kielcino. - 58 Kamieniec. - 59 Górszewice. - 60 Solniki Małe. - 61 Dobra. - 62 Kuniów. - 63 Byčí-skála cave. - 64 Horákov. - 65 Brno-Holásky. - 66 Morašice. - 67 Třebenice. - 68 Retz. - 69 Nagybaráti. - 70 Százhalombatta. - 71 Somlyóhegy. - 72 Somlóvásárhely. - 73 Nagyberki-Szalacska. - 74 Sv. Lovrenc. - 75 Vače. - 76 Magdalenska gora. - 77 Stična. - 78 Novo mesto. - 79 Vitina. - 80 Čitluci. - 81 Aiud. - 82 Căpâri. - 83 Tarquinia.

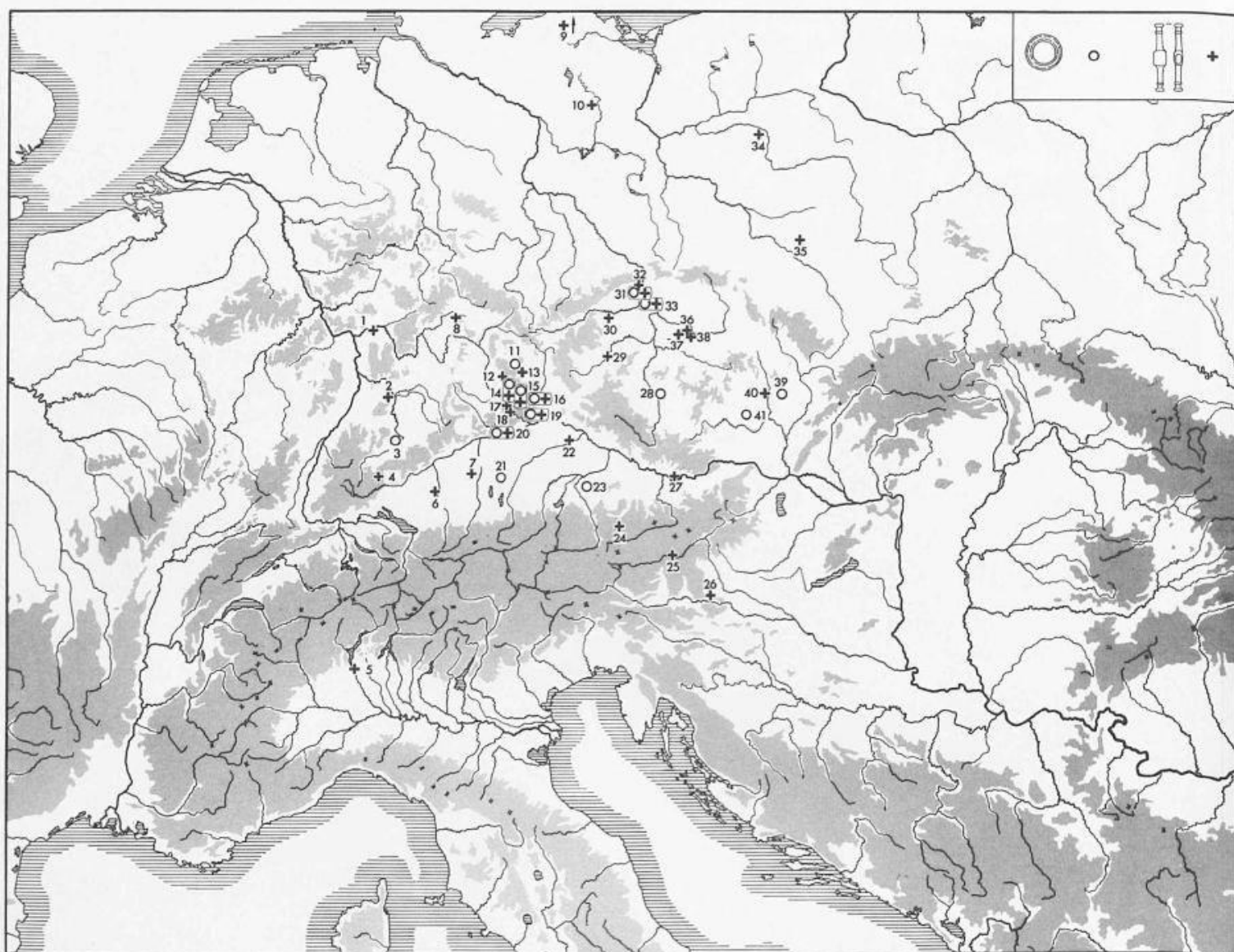


Fig. 101c The distribution of bronze rings with hexagonal or octagonal cross-section (Fig. 100, 8) and of the classic bronze toggles (Fig. 100, 10). For references, see Appendix. 1 Frankfurt-Stadtwald. – 2 Bad Rappenau. – 3 Köngen. – 4 Albstadt-Ebingen, 'Schmiechatal'. – 5 Sesto- Calende. – 6 Tannheim. – 7 Wehringen. – 8 GroÙeibstadt, cemetery I. – 9 Annelöv. – 10 Rauschendorf. – 11 Neukirchen-Gaisheim. – 12 Altdorf. – 13 Illschwang-Gehrsricht. – 14 Unterwiesenacker. – 15 Velburg-Lengenfeld. – 16 Schmidmühlen-Markhof. – 17 Thalmässing-Alfershausen. – 18 Beilngries. – 19 Beratzhausen. – 20 Moritzbrunn. – 21 Maisach-Gernlinden. – 22 Pilsting-Waibling. – 23 Gilgenberg. – 24 Hallstatt. – 25 Strettweg. – 26 Kleinklein. – 27 Mitterkirchen. – 28 Týn nad Vltavou. – 29 Dyšina. – 30 Lipno. – 31 Lovosice. – 32 Lhotka. – 33 Budyně nad Ohří. – 34 Gorszewice. – 35 Dobra. – 36 Plaňany. – 37 Bylany. – 38 Hradenín. – 39 Horákov. – 40 Brno-Holásky. – 41 Morašice.

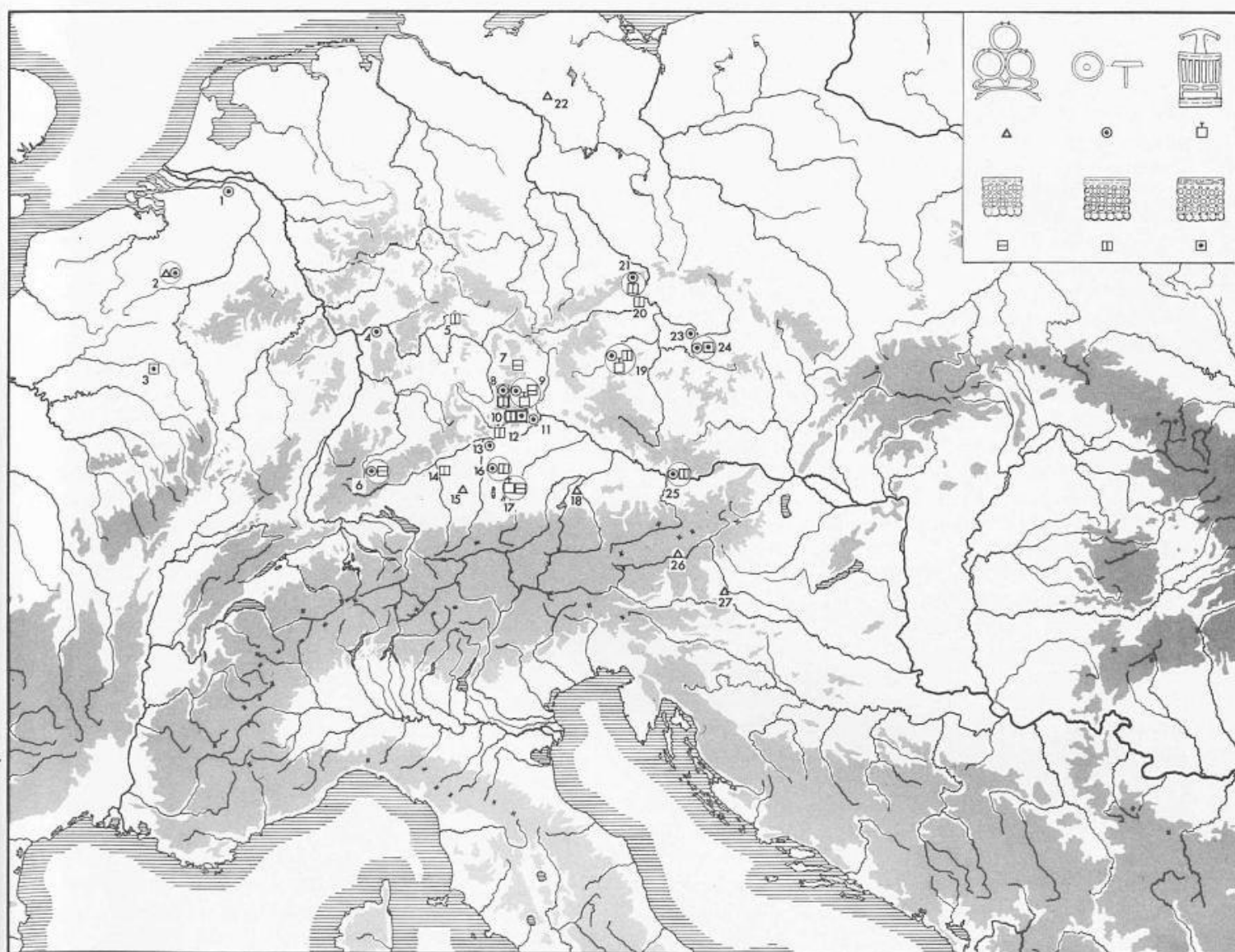


Fig. 101d The distribution of rein-rings of type Leibnitz (Fig. 100, 9), oval bronze plaques from yoke terminals (Fig. 100, 11), 'Jochschnallen' with anchor-shaped terminals (Fig. 100, 12) and the three typical forms of 'Jochschnalle' (Fig. 100, 13-15). For references, see Appendix. 1 Oss. - 2 Court-St.-Etienne. - 3 Saulces-Champenoises. - 4 Frankfurt-Stadtwald. - 5 Großebstadt, cemetery I. - 6 Albstadt-Tailfingen. - 7 Neukirchen-Gaisheim. - 8 Thalmässing-Alfershausen. - 9 Unterwiesenaacker. - 10 Beilngries. - 11 Riedenburg-Haidhof. - 12 Moritzbrunn. - 13 Ortlfing. - 14 Vöhringen. - 15 Mindelheim. - 16 Maisach-Gernlinden. - 17 Pullach. - 18 Tittmoning. - 19 Dýšina. - 20 Lovosice. - 21 Lhotka. - 22 Seddin. - 23 Plaňany. - 24 Hradenín. - 25 Mitterkirchen. - 26 Strettweg. - 27 Leibnitz.

14, 7). One of the pottery vessels from Gündlingen (Pl. 32B, 15) also seems to indicate a late date in Ha C (compare a vessel from Albstadt-Tailfingen, in a grave which can probably already be dated to Ha D1: Zürn 1987, pl. 463, 5). In the case of Leipheim the pottery should clearly be assigned a late position in Ha C, as Kossack argued, but it is not certain whether the hemispherical ring-footed rein-knobs found in the 19th century excavations really belonged to the wagon-grave uncovered in 1951 (see cat. no. 125; Kossack 1959, pl. 35). It is quite possible, however, that hemispherical ring-footed rein-knobs continued till the end of Ha C, after the other elements of rich horse-gear illustrated on Fig. 100 had already gone out of use.

Early (Ha C1) horse-gear is also characteristic of graves with type 2 wagons. In five cases wagons of type 2 were certainly associated with early horse-gear (Köngen; Beratzhausen grave 3; Gaisheim tumulus 6; Lengenfeld tumulus of 1870; Mitterkirchen, tumulus X, grave 1). Another five graves with such horse-gear may have contained type 2 wagons (see Ch. 7.2: Albstadt-Ebingen; 'im Rauenwiesle'; Fürstenfeldbruck; Moritzbrunn; Unterwiesacker tumulus 4; Thalmässing). Indeed, it was explained in Ch. 7 that the openwork bronze plaques typical for type ii wagon-box decoration are intimately related to 'Jochschnallen' (compare Fig. 74, 1.11.21-22.24.29-31.35-7 with Fig. 100, 13-15). In five graves with wagons of type 2 the burial was provided with an iron sword and a bronze pin or pins (Hossingen; Beratzhausen grave 3; Gaisheim tumulus 6; Neu Esting; Lengenfeld); it was mentioned above that swords and pins are regularly attested in male graves with rich horse-gear, which underlines the early position in Ha C of type 2 wagons. This set of male equipment, with a sword and a pin as a dress-fastener, could be a continuation of Urnfield customs. Although in Ha C the pins are obviously developed typologically, their small profiled heads still seem to be related to the pins of the late Urnfield period (e.g. Pl. 86B, 3; Torbrügge 1979, pl. 56, 8; Zürn 1987, pl. 491B, 1-2).⁸

10.2.2 Later graves in Ha C

While the early inception of 'rich horse-gear', and consequently of Ha C1, is not open to question, the characterisation of the later part of Ha C is beset with problems. Recently some authors have even called into question the existence of Kossack's Ha C2 phase (Torbrügge 1979, 191-214; Spindler 1980, 215-8; Hoppe 1986, 86-8). All three authors believe that most of the

elements typical for Kossack's C2 phase in reality already belong to Ha D.

It was noted above that Kossack was able to show that graves with later Ha C pottery, often related in form or decoration to Ha D vessels, never contained the 'rich horse-gear' illustrated on Fig. 100. Instead the harness fittings were simple, mainly consisting merely of iron horse bits; he mentioned the following examples: Step-pach; Leipheim tumulus 14; Augsburg-Kriegshaber tumulus 1; Pullach, 'Süd', tumulus 11; Eching; Nieder-ambach tumulus 3; Schlipps (ibid. 1959, 231, fig. 43, 1-2; pls 35; 54; 85, 8-13; 120, 1-17; 121, 1-6.13-14). Now while it seems generally accepted that in South Bavaria the phase with 'rich horse-gear' (Ha C1) was followed by a period in which horse harness was not generally decorated with elaborate metallic fittings, it is a matter of controversy whether some of these later graves can be assigned to a second Ha C phase (Ha C2). The answer to this question lies in a study of the pottery grave goods.

The publications of Kossack (1959), Torbrügge (1965; 1979) and Hoppe (1986) give a reliable impression of the character of the pottery goods in Ha D1 in Bavaria. There are numerous graves well dated by late Hallstatt metallic ornaments: they generally contain relatively few vessels compared to Ha C1, which now bear simpler or novel types of decoration. These assemblages provide important information on the appearance of pottery in Ha D1, and are crucial for our knowledge of pottery development in the Hallstatt period: for this reason, a number of important graves are listed here. Examples from Beiln-gries include graves 44, 82, 112 and 132 from the 'Ried-Ost' cemetery, graves 46, 68 and 90 from the 'Ried-West' cemetery and graves 19/3 and 19/15 from the 'Grund-Ost' cemetery (Torbrügge 1965, pls 7; 11, 3-6; 20, 70-77; 23, 21-26; 37, 10-21; 40; 41, 3-9; 56; 58, 15-20). Examples from the Oberpfalz include Gaisheim tumulus 2 (von Forster 1913, pl. 28, 7366, 1.33-35 and 7367, 1; Torbrügge 1979, pl. 153, 4-5); Oberhofen grave 2 (ibid. 1979, pls 110, 6-7; 111); Mutenhofen grave 3 (ibid. 1979, pl. 129, 8-10); Oberreinbach grave 1 (ibid. 1979, pls 138, 2-7; 139); Pillhausen (ibid. 1979, pls 121-4); and Zeitlarn, tumulus 1, grave 1 (ibid. 1979, pls 100-101). From Mittelfranken we can mention Weihenzell (Hoppe 1986, pls 6, 10-11; 7); Erlangen secondary grave D (ibid. 1986, pl. 11, 7-19); Simmershofen tumulus 1 (ibid. 1986, pls 26, 3-16; 27, 1-3); Kirchensittenbach, tumulus 3, secondary grave 2 (ibid. 1986, pl. 54, 1-10); Schnaittach, tumulus 8, 'primary grave' (ibid. 1986, pls 93, 5-9; 94, 1-3; note that the central area of the tumulus may have contained more than one cremation burial); and Thal-

⁸ The Mitterkirchen grave, housing a female burial, has a rather different set of goods. It contains a range of ornaments: a belt-hook, a pair of spectacle-shaped fibulae with figure-of-eight loop and a number of foot-rings with 'D'-shaped cross-section (the three types are also found together in Hallstatt grave 366; the foot-rings bear the same decoration: Kromer 1959, pl. 59, 1-3). The spectacle fibulae have no precise chronological value (Betzler 1974, 128-30). On the other hand, the foot-rings with 'D'-shaped cross-section have been considered typical for Ha C1 by G. Kossack and I. Kilian-Dirlmeier (Kossack 1959, 28; Kilian-Dirlmeier 1969, 104), while the belt-hook is more characteristic for a later part of Ha C in the Hallstatt cemetery. A study of the chronology of the Hallstatt cemetery is presently being prepared for publication by F. R. Hodson and it seems wise to await his results before making a judgement on the date of the 'T'-shaped belt-hooks and the Mitterkirchen grave. Indeed, further information is to be expected from the Mitterkirchen pottery which will likewise be published in the near future.

mässing cremation grave 1 (ibid. 1986, pl. 110, 5–11). In South Bavaria the following examples can be mentioned: Staatswald Mühlhart tumulus 53 (Kossack 1959, pl. 67, 2–7); Wildenroth-Grafrath tumuli 7–9 (ibid. 1959, pls 72, 14–20; 73, 15–26; 74, 1–8); Untermettenbach (ibid. 1959, pl. 48, 1–6); Buch am Erlbach tumulus 3 (ibid. 1959, pl. 122, 1–6); and Riedenburg-Haidhof grave 2 (Engelhardt 1985, 87–89, figs 13–15 and 111, fig. 34, 1).

Since Torbrügge and Hoppe have suggested the possibility that the Ha C and Ha D1 graves could represent contemporary burials of different social groups, it is particularly important for our study to consider the pottery from rich Ha D1 graves with wagons or horse-gear – because the latter graves presumably belonged to members of a social group comparable to that represented by the Ha C graves containing wagons and horse-gear. And *contra* Torbrügge and Hoppe, the Ha D1 representatives of this social group are evidently later than those of Ha C. Although horse-gear graves are already rare in Ha D1,⁹ the reliably dated examples from Obernricht clearly contain pottery types comparable with those from the late Hallstatt graves listed in the last paragraph. The grave of 1965 is dated to Ha D1 by the ‘melon-shaped’ armband, serpentine fibula, neck-ring and harness fittings (Torbrügge 1979, 246, fig. 9). Among the 24 vessels are examples with high conical necks (ibid. 1979, 245, fig. 8, 1.2.4.6.15) and it is important to note that with only one exception they are all undecorated. The grave of 1967 contained simple iron bits and at least eight vessels. The vessels included a bottle-shaped example (ibid. 1979, 248, fig. 11, 10) and conical-necked vessels with grooved decoration with good parallels in Ha D1 (compare ibid. 1979, 248, fig. 11, 12.14 with ibid. 1965, pl. 56, 7). The grave with paired iron horse bits from Eugendorf-Kirchberg can also be securely dated to Ha D1, as P. Höglinger demonstrated in his publication of the finds (1987). The wagon-grave from Gottesberg tumulus 3 is dated to Ha D1 by the fragmentary ‘*Vierpaßfibel*’ (Torbrügge 1979, pl. 62, 5) and contains a high-necked vessel with numerous late Hallstatt parallels, particularly in South Bavaria (compare ibid. 1979, pl. 62, 9 with Kossack 1959, pls 29, 1; 30, 8; 44, 17; 64, 12; 67, 2; 68, 20). Wagon-grave 73 from Beilngries, ‘Im Ried-West’, could perhaps also be dated to Ha D1 on account of the iron spectacle fibulae and contains pottery which also has its best parallels in Ha D1 (compare Torbrügge 1965, pl. 34, 39 with ibid. 1965, pl. 56, 5 and ibid. 1979, pl. 111, 1 and Engelhardt 1985, 89, fig. 15, 8).

It seems that the Bavarian pottery of Ha D1 forms a readily recognisable complex with a distinctive character. It is important to note that when rich graves with horse-gear or wagon components are reliably dated by metal objects to Ha D1 their pottery vessels, while sometimes being more numerous, conform to the range of types known from poorer graves dated to the same phase by jewellery and ornaments. It appears very unlikely that

another social group was buried contemporaneously in Ha D1 in rich graves with different (Ha C) pottery, which has been claimed by W. Torbrügge (e.g. 1979, 207). While there seems no doubt that the graves with classic Ha C pottery, iron swords and ‘rich horse-gear’ should be set before Ha D1, the graves with simple iron horse-gear and pottery with late (Ha C2) characteristics require a more detailed treatment.

The wagon-grave from Dietfurt, with its wagon of type 3b, will serve as the first example (Pls 64–7). The late character of the pottery is particularly evidenced by the jar-shaped vessel with two pinched cordons (Pl. 67, 3) and the small conical-necked vessel bearing rich decoration (Pl. 65, 23). The cordoned jar has convincing parallels in Ha D1 graves from Zeitlarn, tumulus 1, grave 1 and Mutenhofen (Torbrügge 1979, pls 101, 6; 129, 10). Tumulus 1 from Zeitlarn also has a secondary grave and a pit, both dating to Ha D1 or later, containing vessels offering parallels for the form and decoration of Dietfurt’s small conical-necked vessel (ibid. 1979, pl. 102, 3.10). Another similar small conical-necked vessel with comparable rich decoration comes from Weillohe, again associated with late pottery (ibid. 1979, pl. 107, 2). The ‘rosette’ decoration of the small conical-necked vessel from Dietfurt is related to a series of decorative motifs formed by a circular depression surrounded by a circle of impressed dots (e.g. Kossack 1959, 37, motif 31) – for example on a vessel from Auerbach (Torbrügge 1979, pl. 32, 1) in a grave probably dated to Ha D1 (compare ibid. 1979, pls 30, 28 and 31, 1 with ibid. 1965, pl. 56, 7). While the iron sword in the Dietfurt grave (Pl. 64, 1) indicates a date in the older Hallstatt period, a late position in Ha C is suggested by the pottery’s links to Ha D1. As we would expect from Kossack’s results in South Bavaria, the rich horse-gear of the earlier or classic Ha C phase is lacking in the Dietfurt wagon-grave. Instead the harness was simply fitted with iron bits, iron rings, iron toggles and a number of profiled iron riveted knobs (Pl. 65, 2–12.15–19). Wagon-grave 89 from Beilngries, ‘Im Ried-West’, appears to have contained similar iron horse trappings, including riveted iron knobs, and could perhaps be given a date corresponding to Dietfurt, although the two pottery vessels surviving from the grave do not allow chronological precision (Torbrügge 1965, pl. 35).

The next grave to be discussed, from Belzheim, ‘Mähder’, tumulus 104, contained a wagon of type 3, in this case with naves of type Breitenbronn. The grave contained about 17 pottery vessels; although the pottery assemblage should clearly be dated to Ha C (see particularly the small cups and bowls: Hübener 1958, 161, fig. 16, 4–5.8–9), some of the vessels betray late chronological traits. Most characteristic is the vessel with a high conical neck; the upper part of the vessel is painted red and bears black linear decoration (ibid. 1958, 161, fig. 16, 3). This shape is paralleled in tumulus 15 from Mindelheim (Kossack 1959, pl. 28, 4). The spherical

⁹ Apart from the examples mentioned in the text, note also the following Bavarian late Hallstatt horse-gear graves which, however, were in no case reliably associated with pottery vessels: Nennslingen-Wengen tumulus 4; Rehling-Au, tumulus of 1898; Traunstein, ‘Haidforst’, tumulus of 1890–92; Dezenacker. For references, see Appendix.

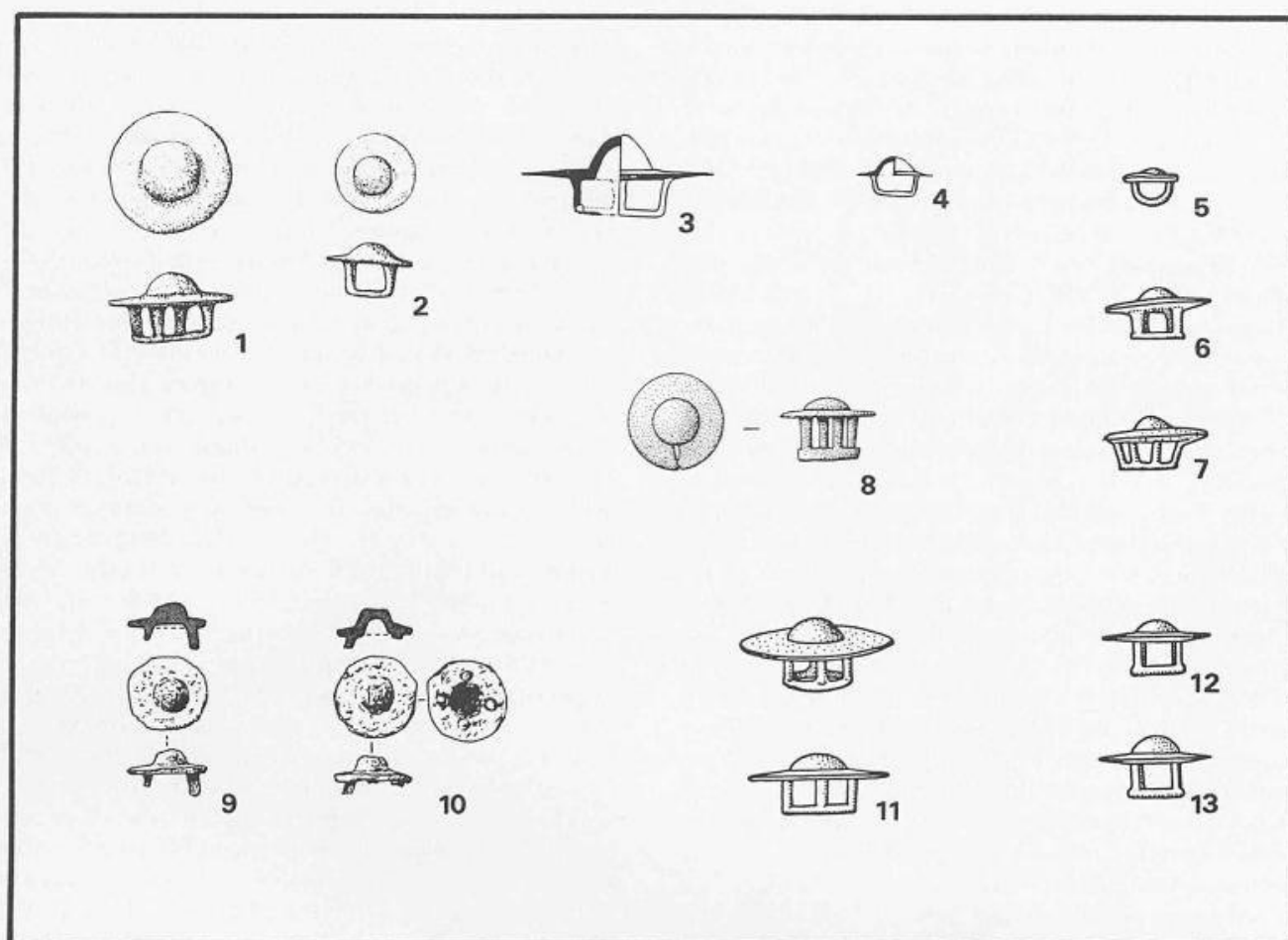


Fig. 102 Rein-knobs with central hemispherical boss and narrow flange: 1-2 Nehvizdky grave 1; 3-4 Rvenice grave of 1966; 5-7 Aubstadt; 8 Miškovice; 9-10 Großeibstadt, cemetery I, grave 4; 11 Solany; 12-13 Ins, tumulus VI of 1848, lower grave. (For references and the sources for the illustrations, see Appendix). — Scale 1:2.

vessel with cylindrical neck and incised rhomboidal decoration from Belzheim has a convincing parallel in the Leipheim wagon-grave (compare Hübener 1958, 161, fig. 16, 6 with Kossack 1959, pl. 35, 21). Finally the conical-necked vessel with vertical black stripes should be mentioned (Hübener 1958, 161, fig. 16, 1); it is similar to a pot in Dezenacker tumulus 2, in the latter case possibly associated with a 'melon-shaped' arm-band (Kossack 1959, pl. 44, 15). The pottery in Mindelheim tumulus 15 can also be compared with the types in the wagon-grave from Augsburg-Kriegshaber (compare *ibid.* 1959, pls 28 and 54). The decoration on the Augsburg-Kriegshaber vessels suggests a late date for the grave, while their shapes

still speak for a position in Ha C. The Leipheim grave, containing a wagon of type 3a, has already been used as a comparison for a vessel from Belzheim. This *ensemble* has been discussed in detail by G. Kossack, and he used the grave to name his Ha C2 'Bubesheim' phase (*ibid.* 1959, 20 – the Leipheim grave was formerly known under the name Bubesheim). While the late position of this grave is evident, the vessels lack exact parallels, and similar decoration and vessel shapes are known in both late Ha C and early Ha D in South Germany. However, if the bronze ring-footed rein-knobs and the twisted ankle-ring from Leipheim belong with the pottery illustrated by Kossack, then a date in Ha C seems certain.¹⁰ Another

¹⁰ The chronology of the hemispherical ring-footed rein-knobs has been discussed above. The ankle-ring finds its closest parallel in a grave from Neukirchen associated with a bronze 'Hohlwulstring', which should be dated to the older Hallstatt period (Kossack 1959, pl. 48, 18-19). The 'Hohlwulstring' from Neukirchen is comparable to an example from Unterstall, associated with Ha C ornaments (Kossack 1959, pl. 42, 1-5). Another similar ring comes from Oberfahlheim, apparently from a rich Ha C female burial (Kossack 1959, 182-3; but see Torbrügge 1979, 147-9). Nellissen's late dating of comparable rings from Tauberbischofsheim seems untenable (Nellissen 1975, 84-5). He assigns grave 9 from the 'Wolfstalflur' to Ha D1 on account of the associated hollow ribbed arm-rings (*ibid.* 1975, pl. 35A), chiefly because similar arm-rings were supposedly found with a 'melon-shaped' arm-ring in grave 11 in the same cemetery (*ibid.* 1975, pl. 36C). However a critical reading of Nellissen's description of the grave suggests that the hollow ribbed arm-ring may have been associated with the toilet implements of Ha C type from 'grave 13' (*ibid.* 1975, pl. 36C, 3 and pl. 37A). As for 'Wolfstalflur' grave 14, Nellissen's dating relies on the 'drum' fibula, which was uncovered 'to the west, above the urns of the primary grave' (*ibid.* 1975, pl. 37C).

wagon-grave with late pottery was excavated in 1907 at Münsing-Buchsee (Pl. 85A; Kossack 1959, pl. 86, 2). Good parallels for the handled cups are found in Pullach tumuli 14, 15 and 16, which represent typical late Ha C ensembles (Kossack 1959, pls 83, 4–9; 84; 85, 1–5; see also the important analysis of Pullach and related pottery by Ruckdeschel 1961, 44–45, fig. 17). The decoration on the two larger pots is found on a vessel from Dezenacker, possibly dating to Ha D1 (compare Pl. 85A, 2–3 with Kossack 1959, pl. 44, 15).

The grave ensembles discussed above (Dietfurt, Belzheim, Leipheim) demonstrate that wagons of type 3 were provided in graves until the very end of Ha C. It is interesting to note that the 'rich horse-gear' of Ha C1 was lacking in these graves – emphasising the probability that such horse-gear (Fig. 100) generally went out of use before the end of the older Hallstatt period. This is underlined by a number of other late graves with poor iron harness fittings, such as Echting, Pullach 'Süd' tumulus 11, Schlipps, Steppach and Götzendorf (Kossack 1959, 231, fig. 43, 1–2; pls 85, 8–13; 120, 1–17; 121, 13–14; Torbrügge 1979, pls 134, 9–10; 135; 136; 137, 1–10). The relative dating of the graves from Großebstadt cemetery I is not without problems, and will not be discussed here. Nevertheless it is worth noting Kossack's argument that the graves with poor horse-gear (graves 2, 3, 5 and 7) were later than grave 1 with rich bronze harness fittings (Kossack 1970, 98–120).

After our treatment of graves with rich (Ha C1) and poor horse-gear, we will turn to another variety of harness recognised by Kossack. In his monograph of 1970, Kossack called attention to a group of bronze or iron rein-knobs with a hemispherical boss and narrow flange (Fig. 102), which he considered typical for the later part of Ha C (ibid. 1970, 111–2). Examples of such rein-knobs were illustrated by Kossack (1970, 114, fig. 12, 1–4.11–14), and a fuller list and distribution map are offered here (see Appendix and Fig. 103). The first fact to be noted is the concentration of grave finds in Bohemia, where finds of early ('Ha C1') horse fittings were also common (compare Figs 101 and 103). This is of some importance considering that flanged rein-knobs are almost never found associated with elements of early harness (the bronze toggles from Lipno and Hradenín grave 14 are the only exceptions). Presumably these two different sets of harness fittings were not used contemporaneously, and a number of finds indicate that the flanged rein-knobs should be dated after the 'rich horse-gear' of Ha C1. Grave 4 from the first cemetery at Großebstadt, containing an atypical wagon without iron tyres, deserves to be mentioned first; among other things the grave housed an iron antenna dagger and late pottery (see the discussion by Kossack 1970, 98ff.; pls 63, 1; 65, 26). The bronze flanged knobs from Hradenín grave 14 should also be given a late date, judging from the associated jar with pinched cordons (Dvořák 1938a, 62, fig. 3, 2–5.14) which is paralleled in graves 5 and 28 from the same cemetery (Dvořák 1938a, 79, fig. 19, 7; ibid. 1935, pl. 3, 16). The other dateable finds with flanged rein-knobs show that this type of horse-gear should still be located within Ha C. For example the grave excavated in

1906 at Budyně nad Ohří contained painted pottery of classic Bylany type and a yoke chain with terminals paralleled in Bad Rappenau tumulus A (Píř 1908, pl. 17; compare Bad Rappenau: Wagner 1911a, 349, fig. 285, 1). Although Pleinerová put forward a date for Rvenice grave 2 of 1966 at the transition from Ha C to D or at the start of Ha D, the pottery seems clearly to belong in the older Hallstatt period (Pleinerová 1973, 290; 296–7). As Pleinerová wrote, the bowl with pendent triangles and spirals (ibid. 1973, 285, fig. 11, 4) has a good parallel in Stradonice grave 5, dated by Koutecký to Ha C2 (Beneš and Koutecký 1970, 537–8; 517, fig. 3, 1). Pleinerová also noted that the vessel with zig-zag decoration on its shoulder (ibid. 1973, 285, fig. 11, 2) is paralleled in Bylany grave 18 of 1895/6, again dated to Ha C (Píř 1897, pl. 48, 15). Pleinerová suggested a late date for the depressed conical-necked vessel with painted pendent triangles, but a similar vessel from Lhotka is clearly early in the Hallstatt period (compare Pl. 118, 19 with Pleinerová 1973, 284, fig. 10, 3). The pottery from Nehvizdky grave 1, Rvenice grave of 1963 and Vikletice grave 138 can also be dated to the older Hallstatt period (Nehvizdky: Koutecký and Špaček 1982, 64–5, figs 8–9; the Rvenice and Vikletice pottery is unpublished), and the pottery from Seloutky cremation grave 2 was assigned to the older Platěnice culture by J. Říhovský (1979, 196, nos 1561–2; 205). It is interesting to note that the two burials in the Rvenice wagon-grave were provided with iron spearheads, corresponding to the appearance of spearheads in graves in a late stage of Ha C in South Bavaria, noted by G. Kossack (ibid. 1959, 20–22; for example the wagon-graves discussed above from Augsburg-Kriegshaber and Leipheim). The iron cheek-pieces from Nehvizdky grave 1 also deserve mention: a reconstruction is attempted on Fig. 104. Their curved shape is quite different from that of the characteristic types of the earlier Ha C phase (e.g. Fig. 100, 3), and seems to be more closely related to examples from Este, 'Pelà' grave 49, dated to the second half of the 7th century, and the 'C'-shaped cheek-pieces from Nagybaráti grave 1, Sütto and Osovo, tumulus II, grave 1 – in the latter two cases again certainly not early in the 7th century BC (von Hase 1969, pl. 20, 253; Börzsönyi 1909, 253, figs 16–17; Vadász 1983, 53–4; 28, fig. 6, 1; 29, fig. 7, 1–2; Benac and Čović 1957, pl. 26, 1).

The relative dating of the rein-knobs with hemispherical boss and narrow flange suggested by Kossack is also supported by typological considerations. These rein-knobs seem typologically to precede examples with a hemispherical boss and broad flange, which are well dated to Ha D1 (e.g. Hohmichele grave VI; Obernricht grave of 1966; Großebstadt, cemetery II, grave 2; see below and compare Figs 102 and 105, 1). If, as seems probable, the rein-knobs with hemispherical boss and narrow flange can be dated to a late part of Ha C, then they represent a regional tradition of harness fittings which existed alongside the tradition of poor horse-gear known particularly from South Germany; these traditions seem to be dated after the 'rich horse-gear' of Ha C1 which previously was common in both areas.

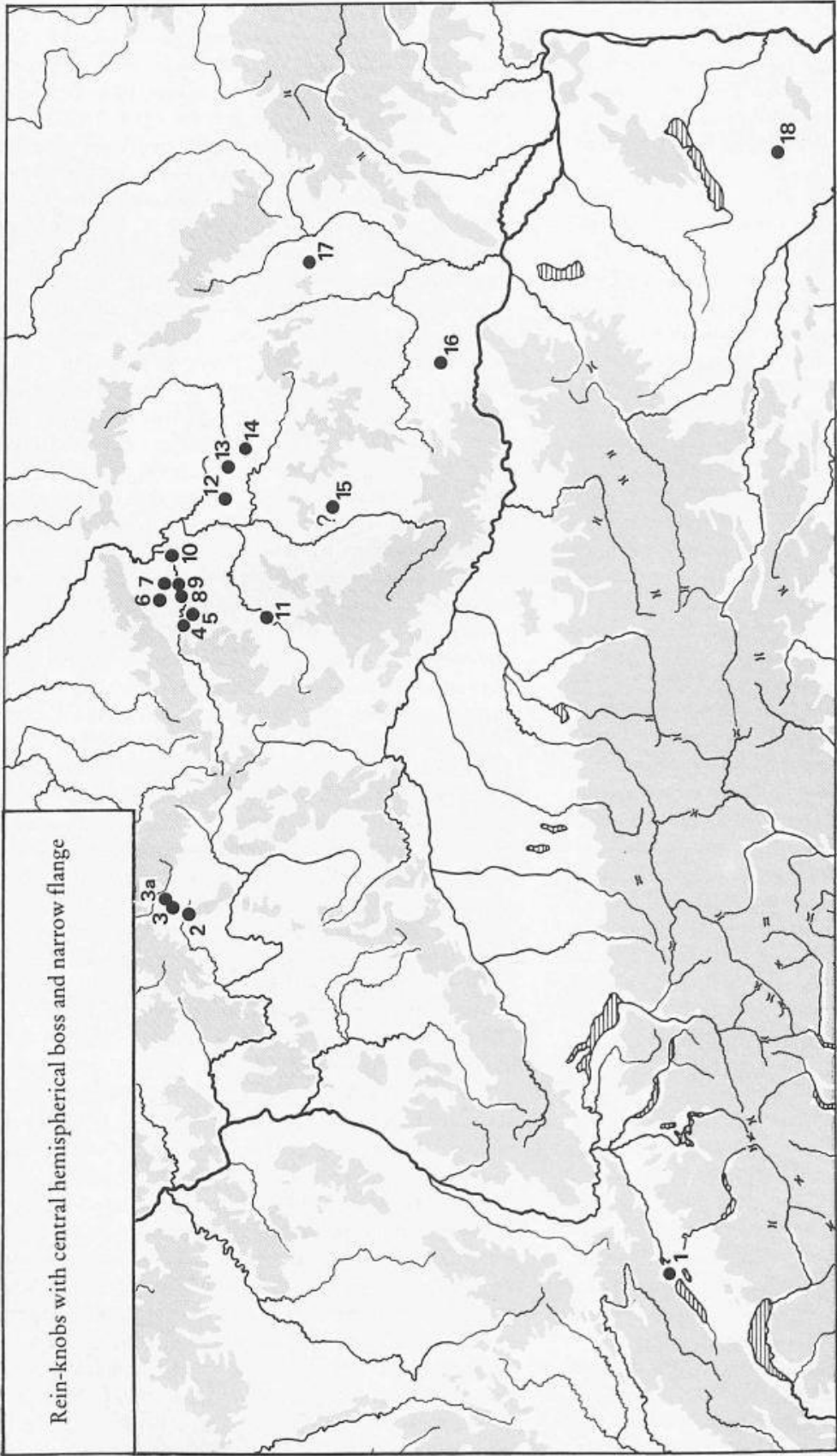


Fig. 103 The distribution of rein-knobs with central hemispherical boss and narrow flange: 1 Ins; 2 Großleibstadt; 3 Aubstadt; 3a 'Vicinity of Römhild'; 4 Vikletice; 5 Lápmo; 6 Skršín; 7 Solany; 8-9 Rvenice; 10 Budyně nad Ohří; 11 Kyšice; 12 Nehvizdky; 13 Hradenín; 14 Miškovice; 15 Bechyně; 16 Roggendorf; 17 Seloulky; 18 Nagyberki-Szalacska. (For references, see Appendix).

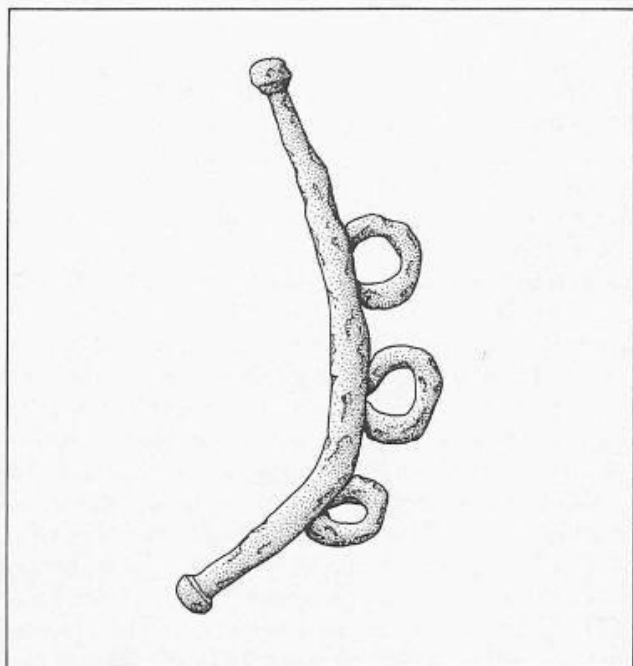


Fig. 104 Reconstruction of the iron cheek-piece from Nehvizdky grave 1 (after Kouček and Špaček 1982, figs 10–11). – Iron. – Scale 1:2.

In Großesbstadt, cemetery I, grave 4 and Vikletice grave 138 rein-knobs with a hemispherical boss and narrow flange were associated with wagon fittings which seem to have been related to wagon type 3. This underlines the fact that wagons of type 3 were in use all through the older Hallstatt period. The small bronze knobs with hemispherical boss and flange from the Poláky wagon-grave could be related to these rein-knobs (Pl. 122A, 8–11). However, the Poláky knobs each have a pair of iron rivets which, while possibly representing the remains of an iron loop, are hardly typical (compare Fig. 102). The chronology of the Poláky ensemble and the typological classification of the wagon both remain somewhat unclear. However, the complete publication of the cemetery, presently being prepared by D. Kouček, promises a more precise date for the wagon-grave. Three other graves with rein-knobs with hemispherical boss and narrow flange had linchpins as *pars pro toto* of a wagon (Miškovice; Nehvizdky grave 1; Rvenice grave of 1963). A number of other graves with linchpins but no other wagon fittings may also be dated to a late stage of Ha C or early in Ha D1, including Großesbstadt, cemetery II, grave 4 (dagger of type Sesto-Calende), Hradenín graves 5 and 18 (late horse-gear and, in the case of grave 5, late pottery) and Nehvizdky grave 2 (late pottery). The graves just mentioned suggest that this burial rite was particularly characteristic of late Ha C and early Ha D but earlier graves (Tuchoměřice and Hallstatt grave 507) indicate that burial of linchpins as *pars pro toto* of a wagon was already practised early in the older Hallstatt period.

The most important grave with rein-knobs with a hemispherical boss and narrow flange is surely the

primary (lower) burial excavated in 1848 in Ins tumulus VI, containing a wagon of type 4. A position late in the 7th century BC seems certain for this grave – supporting Kossack's Ha C2 date for the flanged rein-knobs. A date in Ha C is given by the yoke (Drack 1958a, 12, fig. 9; 13, fig. 10) and the wagon fittings of type 4 which are paralleled in Ohnenheim and Wijchen, where the wagons were associated with iron swords. Furthermore, the nave fittings find close parallels in the famous 'Grande Tomba 3' from Fabriano, Picenum (compare Pl. 24C with Fig. 113), dated to the second half of the 7th century (Ström 1971, 196–7; Stary 1981, 260; Egg 1986c, 28). Both have a conical nave-neck fitted with bands of ribbed bronze and iron sheet; the form of the Fabriano nave-head is clearly similar to that of the Ins nave. Similar nave fittings were probably used on the wagon of type 4 from Dittenheim, where the associated pottery again speaks for a position late in Ha C (Pl. 70A, 11; Hoppe 1986, pl. 123, 2–4.6). The wagon fittings of type 4 from Aislingen were associated with a conical-necked vessel with groups of three circular depressions, certainly to be dated either late in Ha C or early in Ha D (Krahe 1983, 33, fig. 7, 6).

The grave finds from Birnenstorf (Pl. 24B) and Blotzheim (Pls 8B; 9A) do not allow chronological precision. However, the angle-sockets from Birnenstorf should, according to parallels in Ohnenheim (Pl. 14, 3.6.8–9), date to Ha C. The bronze vessels from Birnenstorf cannot be closely dated but, according to Schiek, are related to the 'Hohmichele' type of bronze dishes, suggesting late Ha C or early Ha D (Drack 1977, 115, fig. 15, 1–2; Schiek 1981, 294). The Birnenstorf rein-knobs (Pl. 24B, 6–7) are of a very rare type and are of no chronological use (the only known parallels come from Velem-Szent-Vid: von Miske 1908, pl. 36, 38). The pottery from Blotzheim (Pls 8B, 16.19–21; 9A), partly decorated in Alb-Hegau style, indicates a date in Ha C or early Ha D1.

The iron sword fragment (Pl. 6A, 11), the bronze bits and the hemispherical ring-footed rein-knobs (Pl. 5, 13–14.22–23) from Wijchen speak for a Ha C date. Among other things the grave also contained a bronze socketed axe with a parallel in the Gornja Radgona wagon-grave (Egg 1986a, 201, fig. 2, 2; 203); an even closer parallel is unprovenanced (ibid. 1986a, 203; Mayer 1977, pl. 82, 1136; for another unprovenanced parallel see Cordier and Gruet 1975, 235, fig. 47, 3). This axe type still seems closely related to Urnfield forms, although the shoulder between the blade and socket betrays a date in the Hallstatt period. The fragmentary ribbed bucket, doubtless an Italian import, can be assigned to Stjernquist's Ancona or Novilara groups, but cannot be closely dated within the Hallstatt period (Pl. 6A, 1–5.7.12–13; Stjernquist 1967, 75–9). Although the grave should probably be assigned to the older Hallstatt period, the axle-caps have close parallels in Ha D1 and make a late position in Ha C or at the transition from Ha C to D very likely (compare Pl. 4 with Pl. 42, 5–6 and Zürn 1987, 178, fig. 76, 1–5).

10.2.3 Miscellaneous wagon-graves in Ha C

A number of other wagon-graves cannot be closely dated. The nave fittings from Harburg-Marbach, with their bronze-clad conical necks, already seem to show links to Ha D forms (Pl. 75B, 1). However, the form of the nave-head is comparable with the Breitenbronn nave type, and the tyres of type Ib are otherwise dated to Ha C (Pl. 75B). The associated pottery has not yet been published and so detailed comparisons cannot be made here; however the pottery would support a date in the older Hallstatt period, suggesting a date for the grave late in Ha C.

Wagons of type 3a were associated with iron swords in graves from Hohenfels (Pl. 79A, 8) and Niederhofen (Torbrügge 1979, pl. 44, 13), giving a date in Ha C. The grave-goods associated with other wagons of type 3 are either lost (Straškov grave of 1913; Emmerting-Bruck), unpublished or unrestored (Geißlingen; Belzheim tumulus 109; Mitterkirchen, tumulus II, grave 1) or undiagnostic (Breitenbronn, Pl. 26, 12.16; Nellissen 1975, pl. 2A, 1-2; Beilngries, 'Im Ried-Ost', grave 128; Torbrügge 1965, pl. 27, 1-3.6).

Tyres of types I and II were found in five graves without other wagon fittings; they can be dated as follows: In Gottesberg tumulus 1 tyres of type Ia were associated with an iron sword, an iron bit, bronze yoke bands and pottery, all indicating a Ha C date (Pl. 83B; 84A; Scheidemandel 1902, pl. 6, 6-14; Torbrügge 1979, pl. 60, 1-4). The same date is given for the tyres of type II from Dolany by the associated iron sword (Pl. 107A). Tyres of type II were also found in the tumulus of Hohenstein-Ödenwaldstetten with pottery similar to that from Hohenstein-Oberstetten tumulus I (Zürn 1987, pls 239; 240A; 241), in the latter case with an iron Ha C sword and a wagon of uncertain type (Pl. 37E; Zürn 1987, pl. 243). The tyres of type II from Albertshofen were found in a grave with pottery which probably dates to Ha C (Pls 56B; 57). It therefore seems likely that the type II tyres from Haldenwang also date to the older Hallstatt period, even though the other grave-goods cannot be used for chronological purposes (Pl. 75A).

No wagon fittings survive from the wagon-graves from Aschering and Berghülen; it is also uncertain precisely which goods the graves contained. However, in both tumuli typical Ha C finds were uncovered which suggest that the wagon-graves were dated to the older Hallstatt period (Aschering: Kossack 1959, pl. 90, 6-14; Berghülen: especially Zürn 1987, pl. 3B, 1-2). The nave fittings from Jettingen-Oberjettingen were also uncovered without associated finds; although the fittings are atypical in form, their similarity to the Breitenbronn type suggests a Ha C date, although this remains uncertain (Pl. 41B).

Finally, the grave from Gornja Radgona should be mentioned. The wagon fittings comprised a pair of bronze angle-sockets, associated with a model wagon, weaponry and bronze vessels dating to the 7th century BC (Egg 1986a, 201, fig. 2). As M. Egg wrote, bronze angle-sockets generally date to the 7th century BC, suggesting that the unprovenanced piece from the Eisenstadt museum can be given a similar date (Pl. 127C; Egg 1986a, 210-211).

10.2.4 Summary

The results of our chronological study are illustrated on Fig. 107 and on a distribution map (Fig. 108). We were able to show that the wagons of type 4 date to a late part of Ha C. This corresponds well with our observation that the box decoration of the type 4 wagons (box type iii) seems to be derived typologically from that of wagon type 2 (box type ii). Thus whereas we can conclude that wagon-type 3 was in use all through the older Hallstatt period, it is likely that wagon type 2 was restricted to an earlier part and wagon type 4 to a later part of Ha C. As for the individual wagon fittings, two types of tyres (types I and II), five types of nave (types Lengenfeld, Breitenbronn and Ins, naves with iron nave-head rings but without nave-caps, naves with iron nave-stock rings and nave-neck sheathings) and two types of wagon-box decoration (types ii and iii) were found to be restricted to Ha C. The grave from Wehringen, 'Hexenbergle', tumulus 8, possibly also the grave from La Côte-Saint-André, belong to the earliest horizon of the Hallstatt period, probably before the start of Ha C1. The wagon-graves of Ha C are dated as following:

Earlier Graves in Ha C: [57B] Buchheim, 'Wolfeggshof', Berlin finds; [77] Köngen; [79A] Meßkirch-Langenhart; [81] Meßstetten-Hossingen; [106B] Beilngries, 'Im Ried-West', grave 74; [107B] Beratzhausen grave 3; [114A] Großebstadt, cemetery I, grave 1; [115C] Großebstadt, cemetery II, grave 14; [120] Illschwang-Gehrsricht; [129] Neukirchen-Gaisheim, tumulus 6; [131] Olching-Neu Esting; [135] Pullach, 'Gruppe Süd', tumulus 3; [138] Schmidmühlen-Markhof; [143] Velburg-Lengenfeld, tumulus of 1870; [145] Wehringen, 'Hexenbergle', tumulus 8; [146] Wehringen, 'Hungerbrunnenmähder', tumulus 1; [150] Dýšina; [151D] Hradenín grave 24; [1511] Hradenín grave 46; [153] Lhotka; [168A] Straškov, tumulus of 1911; [170] Tuchoměřice; [175] Hallstatt grave 507; ?[178B] Mitterkirchen X/1; [182] Somlóvásárhely.

Later Graves in Ha C: [1] Wijchen; [3] Blotzheim; [12] Ohnenheim; [20] Birmenstorf; [29B] Ins, tumulus VI of 1848, lower grave; [56] Breisach-Gündlingen, 'Zwölferbuck'; [93B] Tannheim, tumulus VI; [99] Aislingen; [102] Augsburg-Kriegshaber; [108] Dietfurt, grave 31; [110] Dittenheim; [112A] Ehingen-Belzheim, 'Mähder', tumulus 104; [114B] Großebstadt, cemetery I, grave 4; [117] Harburg-Marbach; [125] Leipzig; [127] Münsing-Buchsee; [155] Miškovice; [156] Nehvizdky graves 1 and 2; ?[163] Poláky grave 21; [165] Rvenice, grave 1 of 1963; [171B] Vikletice, grave 138.

Ha C: [47] Aglasterhausen-Breitenbronn; ?[49] Albstadt-Truchtlingen; [54] Berghülen; [66A] Hohenstein-Oberstetten, tumulus 1; [67] Hohenstein-Ödenwaldstetten; ?[73] Jettingen-Oberjettingen; [76] Klettgau-Geißlingen; [83] Reichenau, tumulus B; [93D] Tannheim, tumulus XVI; [93E] Tannheim, tumulus XXI; [100] Albertshofen; [105] Beilngries, 'Im Ried-Ost', grave 128; [106C] Beilngries, 'Im Ried-West', grave 89; [112B] Ehingen-Belzheim, 'Mähder', tumulus 109;

[113] Emmerting-Bruck, tumulus 2; ?[116] Haldenwang; [119] Hohenfels, 'Haidensbuch', tumulus II; [126A] Lupburg-Gottesberg, tumulus 1; [132] Pilsach-Niederhofen, tumulus 4; [133] Pöcking-Aschering; [148/v] Býčí-skála cave; [149] Dolany; [159] Ohrada u Kolína; [161] Pašovice; [168B] Straškov, tumulus of 1913; [171A] Vikletice, grave 17; [178A] Mitterkirchen II/1; [181] Wörgl; [183] Gornja Radgona.

10.3 WAGONS IN THE LATER HALLSTATT PERIOD (HA D)

For a study of late Hallstatt chronology, our interest is directed to the area north-west of the Alps and particularly to the graves from Württemberg. They are often rich in metallic artefacts and have fortunately been the subject of detailed research. We now have a relatively good understanding of the potentialities and limitations of our dating methodology. The first studies of fine chronology were published by H. Zürn in articles of 1942 and 1952. Zürn distinguished an earlier part of Ha D, particularly characterised by serpentine and arched fibulae, from a later part marked especially by drum, double-drum and *Fußzier* fibulae (see the discussion by Dämmer 1978, 64–66). These two phases were later named Ha D1 and Ha D2 by S. Schiek (1954, 153–5). Zürn also recognised a final horizon of graves with a chronologically mixed character, comprising La Tène A objects associated with late Ha D types (especially double-drum and *Fußzier* fibulae); this final part of the later Hallstatt period was named Ha D3 by Kimmig (Kimmig and Rest 1954, 209, note 110). Although Zürn's results found widespread approval, the fine chronology of Ha D has since been the subject of considerable controversy. Nevertheless, with the recent publication of a large number of important graves and the analyses of certain categories of finds from the Heuneburg, the broad lines of chronological development are quite clear, and are generally accepted (e.g. Zürn 1970; *ibid.* 1987; Pauli 1973; Mansfeld 1973; Dämmer 1978; Gersbach 1981; Sievers 1984).

While most scholars employ the conventional Ha D1, D2 and D3 nomenclature, the precise meaning of the terms has been somewhat obscured since their introduction in the 1950s. It is therefore necessary to clarify the usage adopted here. I will start by discussing two new publications by H. Parzinger, who studied the graves from North Württemberg and from the Magdalenenberg tumulus (Parzinger 1986a; 1986b). Parzinger put forward a very fine chronological division for North Württemberg, distinguishing five phases in Ha D (NW I–V). However, as Parzinger emphasised, his chronological system is only valid for this region, with its numerous well excavated cemeteries. For comparison with other areas it is necessary to accommodate this local sequence in the conventional tripartite division. Whereas phase NW I, with boat-shaped and arched fibulae, ribbed band-shaped ear-rings, bronze barrel-shaped arm-bands and bronze belt-sheets with 'rocker' engraving (Parzinger 1986a, 234, fig. 1, 1.6–7.11.14) clearly belongs to Ha D1, phase NW II with serpentine fibulae of Mansfeld's type S5, drum fibulae

made of bronze sheet and hollow bronze or gold ear-rings (*ibid.* 1986a, 235, fig. 2, 16.19.21.28) already seems later. Research on the Heuneburg shows that serpentine fibulae of type S5 are generally later than those of type S4, and it is the latter type of fibula which was contemporary with the boat-shaped and arched fibulae of Zürn's Ha D1 phase (Mansfeld 1973, 74, table 26; for a more recent illustration see the fold-out in Sievers 1984). Because Parzinger's phase NW II includes drum fibulae, it seems wise to include it in the conventional Ha D2 phase. The same is true for phase NW III, with small cast bronze drum fibulae (Parzinger 1986a, 237, fig. 3, 36.38), particularly when it is recalled that small drum fibulae ('phase NW III') were associated with S5 serpentine fibulae ('phase NW II') in the princely grave from Hochdorf (Biel 1982, 71, fig. 5; 1985b, 68, fig. 43; 79, fig. 45; 89, fig. 51). Parzinger's phases NW IV and V can then be assigned to a later phase, Ha D3, with new types including double-drum and *Fußzier* fibulae of types F1, F3 and F4, waist rings (*Leibringe*), *Stangengliederketten* and various types of pendants (Parzinger 1986a, 238, fig. 4, 53.55.58–60.63–4.66; 240, fig. 5, 68.76.82.87.89; 241, fig. 6, 77.79).

This tripartite division of Ha D corresponds well with the terminology for the Heuneburg suggested by S. Sievers (1984, 75). According to her results, Heuneburg period IV can be assigned to Ha D1 (arched, boat-shaped and S4 fibulae), period III to Ha D2 (sheet bronze and cast bronze drum fibulae, S5 fibulae) and periods II–I to Ha D3 (*Fußzier* fibulae). However, it should be noted that genuine *Fußzier* fibulae (Mansfeld's types F1, F3 and F4) and double-drum fibulae first appear at the Heuneburg in period I, while fibulae with a bent-up foot (Mansfeld's type F2) were already used in period III. Because there is no secure evidence for genuine *Fußzier* fibulae or double-drum fibulae in Heuneburg period II, period II should preferably be assigned to Ha D2, as E. Gersbach suggested (Gersbach 1981, 213ff.). Now while the Heuneburg stratigraphy provides a welcome confirmation for the conventional chronology founded on grave *ensembles*, it has also allowed important new insights. H.-W. Dämmer was able to show that pottery in the Alb-Hegau tradition (KAHT) and pottery with a white background (*weißgrundig*) is not represented on the Heuneburg after period IV (Dämmer 1978). According to our terminology, outlined above, it is reasonable to assume that KAHT and *weißgrundige Keramik* – at least on the Heuneburg – are characteristic of the first phase (Ha D1) in the later Hallstatt period.

Before considering the individual wagon-graves it is necessary to mention Parzinger's work on the Magdalenenberg chronology (1986b). He distinguished two phases in the Magdalenenberg cemetery (Magdalenenberg I–II), which he equated with his phases NW I and II in North Württemberg. However, whereas NW II was assigned by me to Ha D2, this hardly seems reasonable for Magdalenenberg II, which lacks the drum fibulae typical for the phase. Indeed, it is interesting to notice that characteristic Ha D2 types, such as S5 fibulae and hollow bronze ear-rings (Parzinger 1986b, 401, fig. 6, 48.60), only appear

once on Parzinger's seriation table, accompanied by atypical grave goods (*ibid.* 1986b, fold-out: graves 12 and 38). In contrast, the typical Ha D1 types, such as ribbed band-shaped ear-rings, S4, arched and boat-shaped fibulae are very numerous and occupy most of the table (*ibid.* 1986b, figs 4–6; fold-out). It is hard to escape the conclusion that almost all of the Magdalenenberg graves should be equated with Parzinger's NW I, and therefore date to Ha D1.

For absolute chronology the imported pottery from late Hallstatt princely seats (especially the Heuneburg), imported bronze vessels from princely graves (e.g. Hochdorf, Vix) and links with North Italian chronological systems (Golasecca, Este, Bologna) are most important. The absolute chronology of the late Hallstatt period has been discussed by the author in a recent article (Pare, 1989b). Our chronological terminology is summarised in the following table:¹¹

HEUNEBURG		N. WÜRTTEMBERG		
<i>Periods</i>	<i>Fibulae (Sievers)</i>	<i>(Parzinger)</i>		
IV	B.K.S4	NW I	Ha D1	ca. 620 BC
III–II	S5.P.F2	NW II–III	Ha D2	ca. 530/20 BC
I	P.dP.F1.F3.F4	NW IV–V	Ha D3	ca. 500/490
				ca. 450/40 BC

10.3.1 Late variants of wagon type 3

It is important to notice that the two wagons of type 3 which are dated later than Ha C have naves of a novel type (Fig. 60, 115A.179). The wagon from Großebstadt, cemetery II, grave 2 had naves with a slightly conical neck and a nave-stock ring, both features which are unknown on the typical Breitenbronn type (Pl. 74B, 1). In fact, these naves were assigned to Variant I of the Breitenbronn type, together with the fragmentary examples from Salzburg-Taxham. The Salzburg-Taxham wagon seems to have been associated with a dagger of type Hallstatt, a fibula and sherds of pottery vessels decorated in the Alb-Hegau style (Moosleitner 1982a, 475, fig. 4, 5; 477, fig. 6, 24–5; 479, fig. 7, 34.37). The dagger is well dated to Ha D1, and pottery of Alb-Hegau type, or in the Alb-Hegau tradition (KAHT, see Dämmer 1978), is not found later in Ha D. The pottery from Großebstadt II/2 has not been restored and, apart from a bronze dish (Wamser 1981a, 234, fig. 9), none of the grave goods associated with the wagon have been published. However M. Schifferdecker, who is preparing Großebstadt II for publication, kindly informed the author that the grave contained 16 ring-footed or looped bronze rein-knobs with a central hemispherical boss and broad flange. These have good parallels in Hohmichele grave VI (Fig. 105, 1), Obernricht (Pauli 1966, 75, fig. 5, 9–14), Riedenburg-Deising (Hoppe 1988, 38, Fig. 1) and Wörgl grave 51 (unpublished, associated finds include a dagger of type Hallstatt and a rhomboidal belt-hook), which indicate a date in Ha D1. This type of rein-knob

(Figs 105, 1; 106; for references, see Appendix) may also be represented in Hradenín graves 5, 18 and 28, but the published photographs are not clear enough to be certain (Dvořák 1935, pl. 2, 19–20; *ibid.* 1938a, 64, fig. 5, 11; 82, fig. 22, 13–14).

The fact that these two Ha D1 wagons both had naves belonging to a developed form of the Breitenbronn type (Variant I) reinforces our conclusion that the typical Breitenbronn naves are dated to Ha C. Großebstadt II/2 and Salzburg-Taxham show that wagons of type 3 were still made in Ha D1, but now with fittings which are recognisably of a typologically further evolved character.

10.3.2 Wagon type 5

The chronological position of wagon type 5 has been touched on by a number of authors. Already in 1942, H. Zürn considered tyres with close-set nails with large rectangular heads (our type VC) as typical for his early Ha D phase (1942, 119); type VC tyres and conical naves were also included in Ha D1 by Kossack in 1959 (1959, 20–1) and Schiek in 1981 (1981, 286–9; 302–3). The following discussion will show that Zürn, Kossack and Schiek were fully justified in their dating of wagon type 5 to Ha D1.

The grave from Albstadt-Ebingen, with a pair of long-footed arched fibulae (Pl. 27A, 11–12), a dagger with wire-wound scabbard (Pl. 27A, 3) and pottery of Alb-Hegau type (Zürn 1987, pl. 444, 1–2; 445A) must be assigned to the earliest stage of Ha D. The Winterlingen

¹¹ The fibula terminology follows Mansfeld 1973. B: arched fibulae; K: boat-shaped fibulae; S4: serpentine fibulae with one loop; S5: serpentine fibulae with two loops; P: drum fibulae; dP: double-drum fibulae; F: *Fußzier* fibulae.

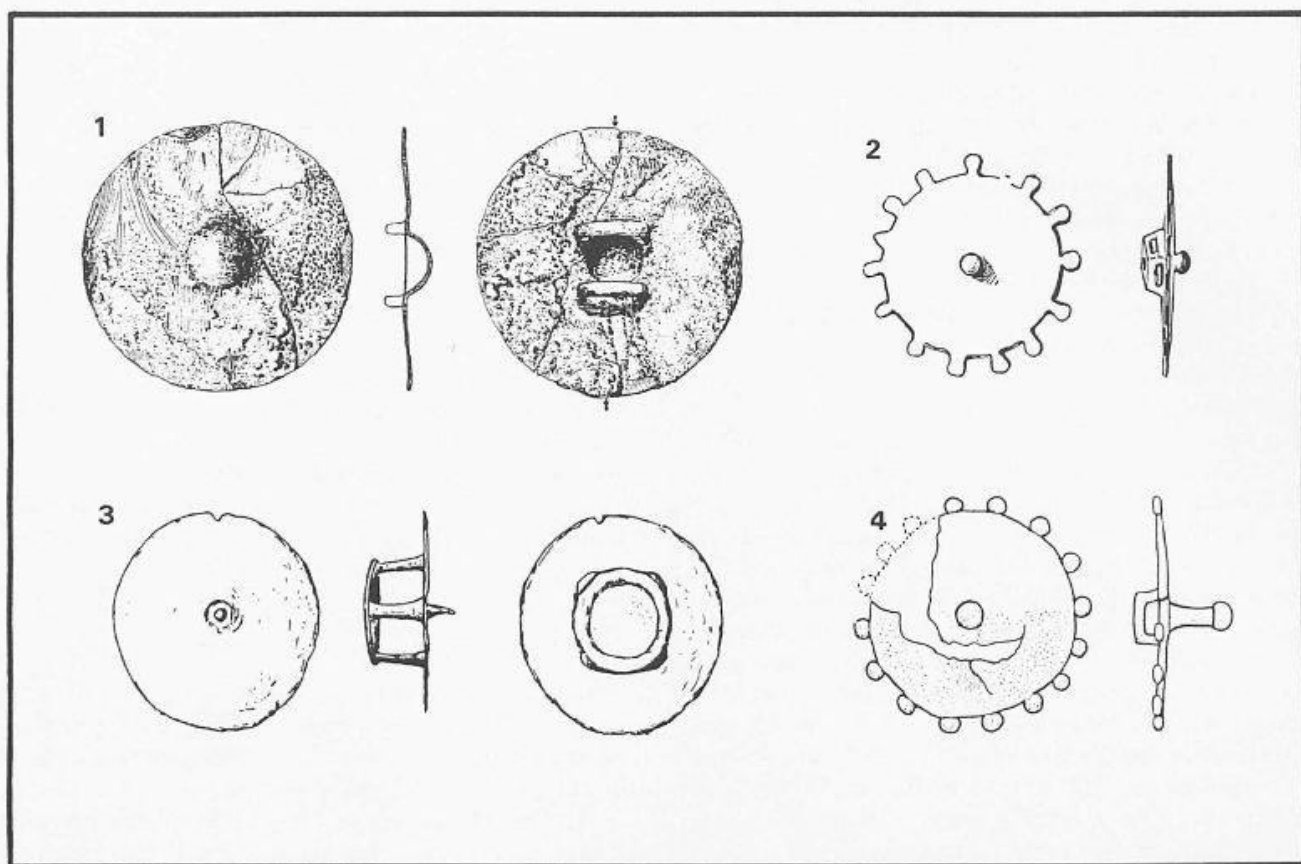


Fig. 105 Rein-knobs of Ha D1, with a central hemispherical boss and broad flange (1 Hohmichele, grave VI), with a central nipple and broad flange (2 Woskowitz Male; 4 Sesto-Calende B), with a central spike and broad flange (3 Villingen-Schwenningen, 'Magdalenenberg'). (For sources of illustrations and references, see Appendix). — Bronze. — Scale 1:2.

grave also contained pottery with fine decoration of Alb-Hegau style (Zürn 1987, pl. 503B), along with a large iron knife (ibid. pl. 496A, 2) of a type known from Hohmichele grave VI (Riek and Hundt 1962, pl. 9, 156–7) and Vilsingen (Zürn 1987, pl. 355A, 1). We must also mention the vessels with decoration in Alb-Hegau style or in Alb-Hegau tradition from Vilsingen which, however, do not necessarily belong to the wagon-grave¹² (Zürn 1987, pl. 355A, 2–6). Nevertheless the bronze dishes of type Hohmichele and the bronze vessels with decoration resembling that on barrel arm-rings allow a date for Vilsingen in Ha D1 (ibid. pls 353, 3–4; 354, 2–3). A sherd with engraved and *Kerbschnitt* decoration was also found in Salem tumulus G, again suggesting a very early date in Ha D (Pl. 47A, 4). Apart from the numerous bronze vessels, the dagger of type Hallstatt and the arched fibula, Kappel-Grafenhausen tumulus 3 contained pottery with engraved decoration but no *Kerbschnitt*; the metallic goods alone are sufficient to date the grave to Ha D1. The wagon-grave from Bitz must also be given an early position in Ha D on account of its bowl with engraved and

Kerbschnitt decoration (Zürn 1987, pl. 478B; see also the two painted sherds from this grave: ibid. pl. 476B, 3–4). The gold ear-ring from the Bitz grave is rather unfamiliar in Ha D1, but does not necessitate a later date (Lindenschmit 1860, pl. 7, 8). Finally we should mention a sherd with white-grounded decoration (*weißgrundig*) from the Emerkingen wagon-grave (Zürn 1943, 31f.; pl. 6b, 3; ibid. 1987, pl. 37A, 2; Dämmer 1978, 171, no. 39). On the Heuneburg this sort of pottery is not represented after period IV, suggesting a Ha D1 date for the grave; according to S. Sievers the same date is indicated by the associated dagger fragment (Pl. 33A, 1; Sievers 1982, 31 – the dagger was mistakenly assigned by Sievers to Würtingen-St.-Johann).

Two graves with daggers, Sulz am Neckar and Mauenheim, tumulus N, grave 3 may also be assigned to Ha D1. The former grave contained a representative of Sievers' variant Sulz of the daggers with wire-wound scabbard, typical for this phase (Sievers 1982, pl. 24, 131). The dagger from the latter grave is unpublished, but was apparently of the antenna-hilted type, speaking for an

¹² The Vilsingen finds are not securely associated. It is interesting that similar pottery with engraved and *Kerbschnitt* decoration was found with arm-rings like those from Vilsingen in Albstadt-Tailfingen (Zürn 1987, pl. 475D, 1–2.5), Burladingen (ibid. pls 481B, 1; 483, 1), Langenenslingen-Andelfingen (ibid. pls 49D; 51A) and Münsingen-Dottingen (ibid. pls 263B; 266B). The question arises whether the arm-rings should actually be dated to Ha C. In that case the wagon, bronze vessels etc could represent a second (Ha D) grave.

early date in Ha D; the grave also contained a long iron serpentine fibula of S4 type, which confirms the Ha D1 position of the grave.

The wagon-grave from Waltenhausen is also securely dated to Ha D1 (Pls 94B; 95A). Apart from the fragmentary bronze belt-sheet of type Ins, with 'rocker' engraving (*Tremolierstich*), the small rings with triangular cross-section and projection (Pl. 94B, 6–7) deserve mention. The latter have good parallels in the Magdalenenberg wagon-grave (Spindler 1971, pl. 1, 6–9). The rein-knobs from Waltenhausen (Pl. 94B, 8.12–13), with a central nipple and broad flange, must be compared to examples from Woskowitz Male/Lorzendorf (Fig. 105, 2; see Appendix). While the Woskowitz Male/Lorzendorf rein-knobs offer no further chronological precision, parallels in Warrior-Grave B from Sesto-Calende (Fig. 105, 4; see Appendix), dated by De Marinis to his phase Golasecca IIA, are important for the absolute dating of wagon type 5. The Sesto-Calende grave finds include bronze nave-neck sheathings which find close parallels among the naves from our wagons of type 5 (Pl. 136, 2). The rein-knobs from the Magdalenenberg grave are rather similar to those from Waltenhausen – having a central point instead of a nipple (Fig. 105, 3). Parallels for the Magdalenenberg rein-knobs (Fig. 106) are known from Buchheim am Kaiserstuhl in Baden, Třtěno and Nymburk (Pl. 120, 2). Sadly none of these finds was associated with datable material but it seems very likely that all three types of broad-flanged rein-knobs belong to Ha D1 (either with a hemispherical boss, a nipple or a point in the centre; see Fig. 106). While the Magdalenenberg wagon-grave should certainly be assigned to Ha D1, the yoke-band with embossed dot-and-circle decoration suggests a very early position, considering that similar yoke-bands are known from definite Ha C contexts (compare Pls 83B; 93, 9 with Spindler 1971, pl. 1, 5).

The chronological position of the 'Heiligenbuck' near Hügelsheim has been discussed in detail by S. Schiek (1981, 302–4). As Schiek showed, the S4 fibula, dagger and bronze dishes of type 'Hohmichele' date the grave to Ha D1 (Schiek 1981, 282, fig. 7, 13; 283, fig. 8, 17.19). Although the rein ornaments from Hügelsheim lack exact parallels, they show a definite similarity with the fittings from Uffing tumulus 1 (compare Schiek 1981, 283, fig. 8, 10–15 with Naue 1887a, pl. 37, 4). And the pottery bowl from Uffing tumulus 1, illustrated by Naue (1887a, pl. 54, 9), reinforces an early date in Ha D. Furthermore the looped disc from Hügelsheim (Schiek 1981, 283, fig. 8, 18), is decorated in the same *Kerbschnitt* manner as the disc-headed socket from Uffing tumulus 6 (Pl. 90C, 1) and the latter grave also contains a fragmentary bronze cup of a type very common in Ha D1 (Naue 1887a, pl. 36, 5).

It is difficult to accommodate grave 28 from Hradenín into the chronological scheme developed for south-west Germany. However, the grave finds betray some links with South Germany – not only the type 5 wagon fittings, but also the bronze dish of type 'Hohmichele', which find their best comparisons in Ha D1 (Dehn 1971, 83, fig. 1). Certain pottery vessels date the grave to Ha D1 in the

local Bohemian chronology (e.g. Koutecký and Michálek 1978, 252–4).

Although the rich grave finds from Marainville-sur-Madon included an iron Hallstatt sword with an ivory pommel, the grave should be assigned to Ha D1. None of the other objects is typical for Ha C; for example the horse-gear, particularly the iron rein-knobs, has closer links with Ha D than to Ha C forms.

Finally, it is necessary to discuss Erkenbrechtsweiler tumulus X (Pls 33C; 34). This seems to be the only grave with a wagon of type 5 requiring a date after Ha D1. The fibulae, either a pair of drum fibulae (Zürn 1987, pl. 72B, 1) or a pair of serpentine fibulae (Pl. 33C, 1–2), would in both cases indicate a Ha D2 date. The same is true for the gold ear-ring (Pl. 33C, 9) which, without having exact parallels, should presumably be compared with the series of hollow gold ear-rings with embossed decoration in south-west Germany and Switzerland dated to Ha D2 and 3.

10.3.3 Wagon type 7

When one reviews the grave goods associated with wagons of type 7, the gold neck-rings and bracelets of the princely burials are particularly striking. In fact, they were present in at least 10 of the graves with this type of wagon (Fig. 117). The importance of the gold ring-jewellery for the purposes of this chapter becomes immediately apparent when it is recalled that in his important article of 1942, H. Zürn considered the princely graves in Württemberg with gold neck-rings and bracelets as characteristic for his later phase in Ha D (ibid. 1942, 118ff.). The following section will reassert the validity of Zürn's result, concluding that neither gold neck-rings nor wagons of type 7 can be dated before Ha D2. Note, however, that in the upper Rhine valley and Switzerland, Zürn (1942, 121f.), and Kimmig and Rest (1954) suspected an earlier date for some gold rings (e.g. Lentigny; Schlatt; Söllingen). The following graves have type 7 wagons and gold neck-rings or bracelets:

1) *Eberdingen-Hochdorf* (cat. no. 59): The princely grave of Hochdorf is well dated in the South German chronology, above all by the fibulae and the dagger. The wagon is associated both with serpentine fibulae of S5 construction and drum fibulae, offering an unequivocal date in Ha D2 (Biel 1982, 71, fig. 5; ibid. 1985b, 68, fig. 43; 79, fig. 45; 89, fig. 51). Furthermore the princely grave was stratigraphically contemporary with two secondary burials with S5 fibulae (Biel 1985a, 51, figs 48–9). The dagger is of Sievers' type Ludwigsburg which is, perhaps with one exception, dated to Ha D2/3 (Sievers 1982, 45; pl. 30, 165A).

2) *Hundersingen, 'Gießbübel', tumulus 1, secondary grave 1* (cat. no. 64A): Hundersingen, 'Gießbübel', tumulus 1 was built over the remains of the Heuneburg's suburban settlement, which was destroyed at the end of period IV. Obviously the wagon-grave (secondary grave 1) can therefore be dated after Ha D1; it is, however, less certain whether it should be assigned to Ha D2 or D3.

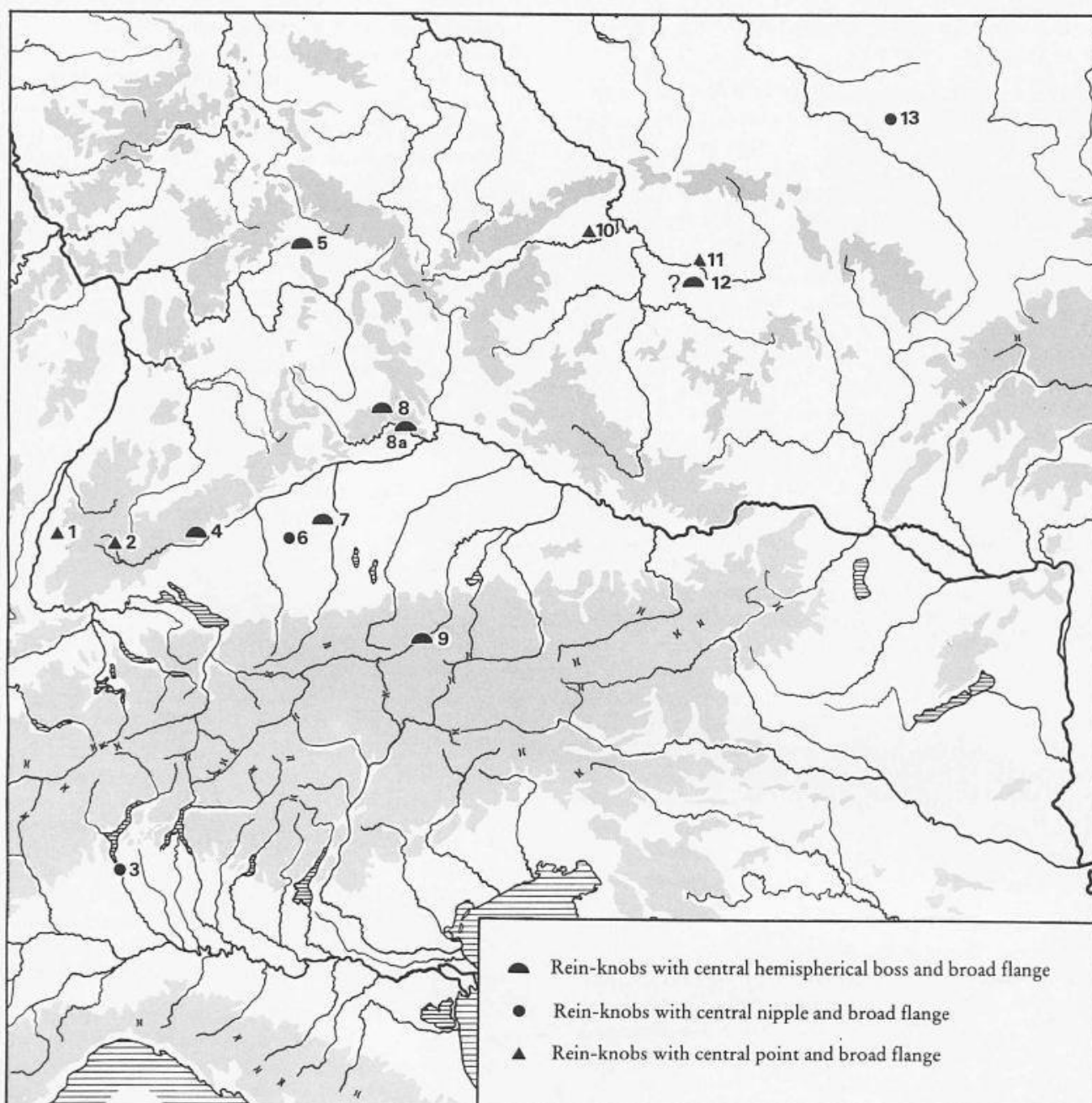


Fig. 106 The distribution of Ha D1 rein-knobs: 1 Buchheim am Kaiserstuhl; 2 Villingen-Schwenningen, 'Magdalenenberg'; 3 Sesto-Calende; 4 Altheim-Heiligkreuztal, 'Hohmichele'; 5 Großeibstadt; 6 Waltenhausen; 7 Augsburg-Wellenburg; 8 Obernricht; 8a Riedenburg-Deising; 9 Wörgl; 10 Třtěno; 11 Nymburk; 12 Hradenín; 13 Woskowitz Male. (For references, see Appendix).

3) Ludwigsburg, 'Römerhügel' (cat. no. 78): It is explained in the catalogue (cat. no. 78) that the wagon-grave in the Ludwigsburg 'Römerhügel' should be regarded as a secondary grave. The primary burial, chamber-grave 2, contained a dagger closely paralleled by the example from Hochdorf and by an example dated to Ha D3 in Hallstatt grave 13 (compare Sievers 1982, pls 29, 165; 30, 165A; 31, 167). According to these comparisons, chamber-grave 1 should be dated to Ha D2/3, a date reinforced by the typological character of the grave's dagger which, however, lacks exact parallels (Sievers 1982, pl. 29, 164).

According to Kimmig and Rest the bronze phalerae from Ludwigsburg (Zürn 1987, pls 151, 1–5; 152) are paralleled in Kappel-Grafenhausen tumulus 1, again suggesting a date in Ha D2 rather than Ha D3 (Kimmig and Rest 1954, 184, no. 13, g).

4) Sainte-Colombe, 'tumulus de la Butte' (cat. no. 13A): The rein-knobs and phalerae from Sainte-Colombe 'La Butte' (Pl. 16, 4.11) have close parallels in the graves with gold neck-rings from Ludwigsburg 'Römerhügel' and Utten-dorf. The iron socketed axe in the grave shows a

relationship with the burial rites of the princely graves from Hochdorf and Asperg 'Grafenbühl'. These graves all date to Ha D2/3.

5) *Kappel-Grafenhausen, tumulus 1 of 1880 (cat. no. 74A)*: The chronological position of the princely grave from Kappel-Grafenhausen is less clear and the grave has often been assigned to Ha D1 on account of the bronze oinochoe, similar to the example from the Vilsingen wagon-grave (compare Kimmig and Rest 1954, 181, fig. 1, 1; pl. 12, 1; with Zürn 1987, 179, fig. 77; pl. 352). However, the ribbed bronze sheath of the iron knife finds parallels only on the later daggers and knives published by Sievers ('*Bronzedolche und Dolchmesser mit entwickelter Knauf- und Scheidegestaltung*' or possibly '*Dolchmesser und Dolche mit ringförmigem Ortband*': Sievers 1982, pls 29–34). And the bronze belt-sheet belongs to a group of closely related pieces, assigned by I. Kilian-Dirlmeier to the 'workshop of type Kaltbrunn', dated in three graves to Ha D2 or later (Kilian-Dirlmeier 1972, 69–71.112–3). The belt-sheet is also related to the wagon-box decoration from Bad Cannstatt and Demmelsdorf, both dated to Ha D2 (Pls 48, 5; 88A, 6–8). The broad gold arm-band from Kappel is comparable with examples from the princely graves from Hochdorf and Sainte-Colombe, both dated to Ha D2/3. Finally, the bronze hemisphere with embossed decoration and gold sheet cover (Kimmig and Rest 1954, pl. 10, 3) seems comparable to a bronze example from Pfronstetten-Geisingen associated with arm-rings with notched ends, found in North Württemberg in Parzinger's phase NW III (Zürn 1987, 148–9; pl. 277A, 6; compare *ibid.* pl. 277A, 1–2 with Parzinger 1986a, 237, fig. 3, 51). In conclusion, there is every reason to date Kappel-Grafenhausen grave 1 to Ha D2; the bronze oinochoe was presumably already old when it was deposited in the grave.

6) *Allenluffen (cat. no. 19)*: The princely grave in the so-called 'Unghürhubel' near Allenluffen, Switzerland, was damaged by farming activity before being excavated in 1847 by Jahn and in 1869 by von Fellenberg. During a partial levelling of the tumulus the farmers found the gold neck-ring, the gold bracelet and the bronze belt-sheet, presumably all from the same grave as the wagon (Pl. 24A), which was uncovered later. It is not certain whether a fragmentary drum fibula was associated. The only object which offers some dating evidence is the belt-sheet of Kilian-Dirlmeier's type Hunderingen (Kilian-Dirlmeier 1972, pl. 17, 210). The closest parallels come from secondary graves in tumulus 1 of the Gießbübel cemetery near Hunderingen, dated to Ha D2/3, and from Hohmichele grave VIII, dated to Ha D2 by serpentine fibulae of type S5 (*ibid.* pls 16, 208–9; 17, 211). However, although a date in Ha D2–3 seems most likely, a comparable belt-sheet from Rances, but with slightly different ribbing, could date to Ha D1 (see Ch. 10.3.5). Thus the chronological position of the Allenluffen grave is not secure although, on balance, a Ha D2–3 date is most likely.

7) *Helpfau-Uttendorf, tumulus 5 (cat. no. 176B)*: Uttendorf

tumulus 5 is also somewhat difficult to date. As M. Egg noted, the iron belt-sheet fragment finds parallels among Kilian-Dirlmeier's variant I of the Créancy type (Egg 1985a, 356–7). The closest parallel is a bronze belt-sheet from Unterlunkhofen tumulus 63, associated with a drum fibula (Egg 1985a, 360, fig. 30; Keller 1882, pl. 5, 6). The bronze belt-sheet from Bülach, 'Baurenhof', tumulus 1, provides another parallel for the Uttendorf decoration, once again associated with drum fibulae (Kilian-Dirlmeier 1972, 57f.; pl. 31, 355). We may also mention the iron phalera from Uttendorf, which is comparable to pieces from Ludwigsburg (Zürn 1987, pls 151, 1–5; 152) and Sainte-Colombe, 'La Butte' (Pl. 16, 4). The small profiled rein-knobs are similar to examples from Kicklingen, which are reliably dated by a fibula to Ha D2 (Pl. 68A, 10). Although unequivocally dated material is not included in the Uttendorf *ensemble*, our comparisons have pointed to a position in Ha D2.

8) *Stuttgart-Bad Cannstatt grave 1 (cat. no. 90)*: The three drum fibulae in the wagon-grave from Bad Cannstatt provide a clear date in Ha D2 (Zürn 1987, pl. 398, 3–4.11).

9–10) *Apremont, 'tumulus de la Motte', graves 1 and 2 (cat. nos 2A; 2B)*: Of the two wagon-graves with gold neck-rings from Apremont, grave 1 is impossible to date exactly. The finds from grave 2 (Fig. 118; Pls 7; 8A), however, included a dagger of Siever's variants Ludwigsburg or Aichach, dated to Ha D2/3 (Pl. 7, 2; Sievers 1982, 48–9).

11) *Asperg, 'Grafenbühl' (cat. no. 52)*: Although only a few scraps of gold were found in the robbed princely grave from the Grafenbühl near Asperg (Zürn 1970, pl. 20, 4–7), the surviving finds show clearly that it was one of the richest graves of the Hallstatt period, and most authors assume that it originally contained a gold neck-ring. Among the locally-produced objects in the grave were two fragmentary *Fußzier* fibulae demonstrating a Ha D3 date.

Summing up the above discussion, we can conclude that our 10 (11 including Asperg) type 7 wagons associated with gold neck-rings or bracelets are all dated to Ha D2 and 3. When they can be dated, the other typical large gold neck-rings can be assigned to the same two phases, without a single piece being associated with Ha D1 objects (for a fuller discussion of late Hallstatt gold, see Pare 1989b).

The graves with type 7 wagons but without gold neck-rings or bracelets are often difficult to date. However, the robbed central grave of Hunderingen, 'Talhaus', tumulus 4 was built over the Ha D1 suburban settlement of the Heuneburg, indicating a Ha D2/3 date. Furthermore, the burial probably took place shortly after the destruction of the suburban settlement (Schiek 1985) and secondary grave 12 contained a pair of serpentine fibulae of S5 construction (Mansfeld 1973, 179, list 69), both facts requiring a Ha D2 date for the central grave. The bronze belt-sheet terminal from the central grave (Pl. 36, 18) would support this dating, with parallels on belt-sheets of the Cannstatt type from the Hunderingen 'Gießbübel'

cemetery, in Hohmichele grave VIII and from Allenlütten, all dated to Ha D2 or D3 (Kilian-Dirlmeier 1972, pls 9, 81; 16, 208–9; 17, 210–11). The grave from Niederrieden, like the grave just discussed, contained rather atypical wagon fittings. Nevertheless, the nave fittings seem related to the Cannstatt type. The profiled iron rein-knobs and phalerae from the grave indicate a date after Ha D1 (Pl. 86A, 9–13). We must also mention Sainte-Colombe, 'La Garenne', where the incomplete grave furnishings apparently included *Fußzier* fibulae with long double springs which, if associated, would date the type 7 wagon to Ha D3.

The chronological position of the type 7 wagon from Augsburg-Wellenburg is of considerable interest, being the only representative of the type dated to Ha D1. The grave goods include iron rein-knobs with a hemispherical boss and broad flange (Pl. 58B, 5–6), related to bronze examples from Hohmichele grave VI, Großebstadt II/2 and Obernricht and iron examples from Wörgl grave 51, all dating to Ha D1 (see Figs 105, 1; 106). The pottery from the grave, including high-necked cups with stamped, engraved and painted decoration and a large conical-necked vessel, also indicate a Ha D1 date (Pl. 58B, 1–2.4). It is interesting to note the fragment of gold sheet with embossed decoration (Pl. 58B, 3) which could be compared to the gold shoe fittings from the Hochdorf grave, although its original function remains uncertain (Biel 1985b, 82–3, figs 46–9; for similar decorative gold fittings, see Ins, tumulus VIII/1848, cat. no. 29D). It was already mentioned in Ch. 5.18 that the Wellenburg naves lack the ribbed decoration seen on most other members of the Cannstatt type (Pl. 59, 1–5) and, taken together with its early chronological position, it could be concluded that Wellenburg was the typological forerunner of wagon type 7. An early date is also possible for the type 7 wagon from Meßkirch-Langenhart, owing to the fragmentary fibula from the tumulus (Pl. 43B, 2). According to Mansfeld, the fibula was probably of the one-looped S4 type but it should be emphasised that the star-shaped bow cross-section makes the fibula untypical and difficult to date (Mansfeld 1973, 166, list 32: 'Engelswies-Hackenberg'). Perhaps the atypical decoration of the Langenhart naves, with iron bands instead of ribs, should be regarded as an early characteristic within the Cannstatt nave type; however there is little definite evidence to support this supposition (compare the naves from Quinçay, Hochdorf and Kappel-Grafenhausen tumulus 1: Figs 71a; 93; Pl. 41C, 1–3).

The other burials with wagons of type 7 lack precisely dated grave goods. At any rate, none of the graves contradicts the unequivocal date we have obtained for wagon type 7. Without exception, the well-dated graves can be assigned to Ha D2–3; only the wagon with atypical naves from Augsburg-Wellenburg has been given a date

in Ha D1, whereby the wagon could represent the typological ancestry of wagon type 7.

10.3.4 Wagon types 6a and 6d

The chronology of the wagons of type 6 with type Kicklingen naves (wagon type 6d) is clear-cut. All three graves had fibulae dating to Ha D2: in every case being of the drum fibula type (Kicklingen: Kossack 1959, pl. 39, 18; Weinsfeld: Wamser 1982, 185, fig. 15, 1–2; Demmelsdorf: Abels 1985, 74, fig. 3, 12–13). The pottery from Demmelsdorf seems to be related to the red-polished wares on the Heuneburg, likewise speaking for a Ha D2 date (Voß 1984). The other wagons of type 6 are less well dated, and must be discussed in greater detail.

The wagons of type 6 with naves of type Repperndorf (wagon type 6a) have been found in graves dating to every phase of the later Hallstatt period. In the case of Mauenheim, tumulus M, grave 3, the wagon was reliably dated to Ha D1, but the naves were rather unusual in form (Pl. 39B, 3). The characteristic Ha D1 objects in the grave included a bronze belt-sheet with 'rocker' engraving (*Tremolierstich*) and long barrel-shaped lignite arm-bands. The bronze barrel arm-band with engraved decoration from Praha-Bubeneč (Pl. 123, 6) should probably also be assigned to Ha D1, according to general parallels from the Oberpfalz (e.g. Torbrügge 1965, pl. 6, 7–8), Mittelfranken (e.g. Hoppe 1986, pl. 26, 7) and Switzerland (Drack's groups B and C; Drack 1965, 20, fig. 8; 22, fig. 9; 23, fig. 10).¹³ However, the arm-band could also be related to the 'turban' rings of south-west Bohemia, whose chronology is quite uncertain (Šaldová 1957). A Ha D1 date has also been suggested for the grave from Offenbach-Rumpenheim, on account of the associated pottery (Ulrich 1973, 315). Until the grave goods have been published, this will remain uncertain.

The graves from Repperndorf and Görau, on the other hand, are dated later in the Hallstatt period. In the case of Görau, the S5 fibulae and ear-rings date to Ha D2 (Pl. 99A, 1–5.7); the neck-rings and bracelets are very similar to the examples from Demmelsdorf, likewise Ha D2 (compare Pl. 99A, 6.8–16; with Abels 1985, 74, fig. 3, 1.11). In the case of Repperndorf, the fibula with a curved-up foot terminating in a decorative button is certainly late in Ha D (Pl. 81, 14).

The other two wagons with naves of type Repperndorf are more difficult to date. The example from Oberleinach has no securely associated goods, but the other finds from the tumulus suggest a date in Ha D2 or 3 (Müller-Karpe 1953, 57, fig. 1). The wagon from Igersheim-Simmringen was associated with fragments of a yoke-chain, of a type known from the princely graves of Ha D2–3 (Pl. 39A, 3.6.10.14; see for example Hochdorf: Biel

¹³ Closer parallels are known from the Býčí-skála cave (Wankel 1970, 125, fig. left) and from Velké Prosenice (Šolle 1955, 123, fig. 12, 6). However, the Moravian parallels are not closely dated. The example from Velké Prosenice could have been associated with the 'melon'-shaped arm-band published by Šolle, which would argue for a Ha D1 date, but his text provides no information about the find circumstances (ibid. 123, fig. 12, 5).

1985b, 154, fig. 83; Hundertingen, 'Gießbübel', tumulus 1, secondary grave 1: Schiek 1956a, pl. 16, 1).

10.3.5 *Wagon types 6b and 6c*

The graves with simple undecorated iron wagon fittings of types 6b and 6c are generally dated late in Ha D. Definite late graves include Bell (Ha D3, see Joachim 1987, 136), Ivory (late, possibly 'Jogassien' fibula, Joffroy 1958, 23, fig. 4, 5), Saraz and the upper grave from Ins tumulus VI (both with short-swords dated to Ha D2-3, Sievers 1982, 49). The finds in the tumulus of Grandvillars all seem to be dated to the later part of Ha D and, if the finds from grave 'f' can be regarded as associated with the wagon fittings, then the hollow bronze arm-rings indicate a date in Ha D2-3 (Joffroy 1958, 53, fig. 10, 10; see Drack 1970, 46 - group E/2). The same date is suggested for the wagon-grave from Weilerbach from which, apart from the wagon fittings, the only surviving grave good is a hollow bronze ear-ring of a type not found before Ha D2 (Engels 1969, pl. 2, 1).

Another five graves from Switzerland and East France contain gold objects and seem to represent a related group, not only regarding their wagon fittings. The gold objects from Hermingen (Drack 1958b, pl. 3, 1-4) presumably came from the wagon-grave with iron fittings of type 6b (Drack 1958a, 24, fig. 22, 1-3.7-9). The objects include a hollow bronze neck-ring covered in gold sheet (Drack 1958b, pl. 3, 3), comparable with the pieces from Rottenburg-Baisingen (Zürn 1987, pl. 414, 1), Dürdingen (presumably associated with a gold-plated drum fibula; Drack 1964, pls 6, 6; 7, 10), and Châtonnaye (ibid. 1964, pl. 1, 12). Apart from the wagon fittings of type 6c and the iron neck-ring covered with gold sheet, the Châtonnaye grave contained part of a dagger of the Aichach variant dating to Ha D2 or D3 (Sievers 1982, 48; pl. 34, 183). Ins tumulus VIII of 1848 and Urtenen both contained wagon fittings of type 6c and remains of rich female costumes including the gold heads of 'Zweischalennadeln' (Drack 1958b, 13, fig. 5b; pl. 8, 122.124; pl. B, 2; ibid. 1959, pl. 14, 7-9; for the possible gold shoe fittings in the Ins grave, see Osterwalder and Breitenbach 1980, 84, fig. 2); the gold 'Zweischalennadeln' give a date in Ha D2-3, which is supported by the gold ear-rings in both graves (Dämmer 1974, 287). Presumably the undecorated narrow gold neck-ring in the wagon-grave from Savoyeux can be given a comparable late date (Joffroy 1958, 47, fig. 9, 4). Similar gold jewellery from Hatten and especially from Mercey-sur-Saône are certainly to be located very late in the Hallstatt period (Frey 1957, pl. 18, 1; Duval 1987, 74, figs 90-91).

It remains to mention the grave with wagon fittings of type 6c from Rances (Drack 1964, pl. 24). Apart from the wagon, the grave contained a ribbed bronze belt-sheet of

Kilian-Dirlmeier's type Hundertingen which, like the graves discussed above, would be quite at home in Ha D2 or D3 (Kilian-Dirlmeier 1972, 35-7; pl. 18, 222). However, the grave goods also included a fragmentary iron hilt which could have belonged to an early antenna-dagger (Sievers 1982, 15-18; pl. 3, 15). While normally this object would suggest a Ha D1 date, the uncharacteristic nature of the piece and the chronology of the other wagons with fittings of types 6b and 6c, not to mention the belt-sheet of type Hundertingen, speak for a later position, perhaps in Ha D2.

10.3.6 *Two-wheeled chariots*

It is generally held that while four-wheeled wagons are typical of the Hallstatt period, two-wheeled chariots comprise an important element of La Tène culture. While this is true in the overwhelming majority of cases, four graves of the Hunsrück-Eifel culture (HEK) from the end of the Hallstatt period contain remains of chariots.¹⁴

The chariot-grave in Hundheim tumulus 2 (Haffner 1976, 192, figs 42-3; 193, fig. 44, 2-13; pl. 5, 6-11) is dated to the end of the Hallstatt period (Ha D3) by its bronze arm-ring and by a secondary grave containing a pottery vessel characteristic of the late Hallstatt phase HEK IB (Haffner 1976, 70; pl. 5, 11-12). In tumulus 1 it is the bronze situla and iron pin which give a date in late Ha D (ibid. 70; pl. 5, 4-5). The *Fußzier* fibula from Oberlahnstein dates the chariot-grave to Ha D3 (Behagel 1943, pl. 11H, 6), and the same date is given to Schwalbach on account of the bronze arm-ring and pottery vessel (Schoppa 1961, 167, fig. 6, 1-2).

Whereas E. Soudská assigned Manětín-Hrádek grave 196 to a mixed Hallstatt-La Tène horizon ('Ha D3'), with the pottery still being typical of late Hallstatt cremation graves (Soudská 1976, 642.644-8), the metal objects appear to indicate a definite early La Tène date. For example the iron phalerae (Soudská 1976, 628, fig. 3, 4-5.7-9) resemble early La Tène bronze examples (compare the examples illustrated by Dehn 1966), and the amber and gold disc seems related to early La Tène examples from the Dürrenberg bei Hallein (Soudská 1976, 629, fig. 4, 13-14; compare Dürrenberg grave 39/2; Penninger 1972, pl. 37B, 2).

It is important to note that the four late Hallstatt (probably Ha D3) chariot-graves all come from the Middle Rhine area. It is also interesting that in the two well excavated graves, the inhumations clearly lay on the chariots with their feet pointing in the direction of the chariot pole. In an ingenious article, J. Driehaus called attention to the fact that in wagon burials of the Hallstatt period the corpse was carried on the wagon with the head forward,¹⁵ whereas in the La Tène period, the corpse was driven feet first (Driehaus 1975). In the Middle Rhine

¹⁴ The vehicle from Großebstadt, cemetery I, grave 4 is exceptional because the most likely reconstruction suggests a simple cart with two small wheels (see cat. no. 114B). The vehicle should not be regarded as a chariot.

¹⁵ The only example in the Hallstatt culture of a four-wheeled wagon bearing a corpse with the feet in the direction of the wagon pole is represented by the Vix grave (according to the new reconstruction: Egg and France-Lanord 1987). But this grave is exceptional in many other respects, and already shows numerous links to the La Tène culture (Driehaus 1975, 68). Torbrügge (1979, 128, note 454) accords the new orientation little importance, noting that there was a general change in burial orientation in the early La Tène period.

	Wagon fittings											
	1	2	3	4	5	6/1	2	3	4	5	6	7
Br D												
Ha A1												
Ha A2												
Ha B1												
Ha B3												
Ha C					La C.	145						
Ha D1								Var. I				
Ha D2										62		103
Ha D3												

Fig. 107 Summary of the chronological development of wagon finds of the Urnfield and Hallstatt periods (the numbers 1–6 on the left refer to the section headings in Ch. 3; the numbers 1–7 on the right refer to the wagon types of the Hallstatt period; La C.: La Côte-St.-André; 145: Wehringen, 'Hexenberg', tumulus 8; Var.I: wagons of type 3 with variant I of the Breitenbronn nave type; 62: Erkenbrechtsweiler; 103: Augsburg-Wellenburg).

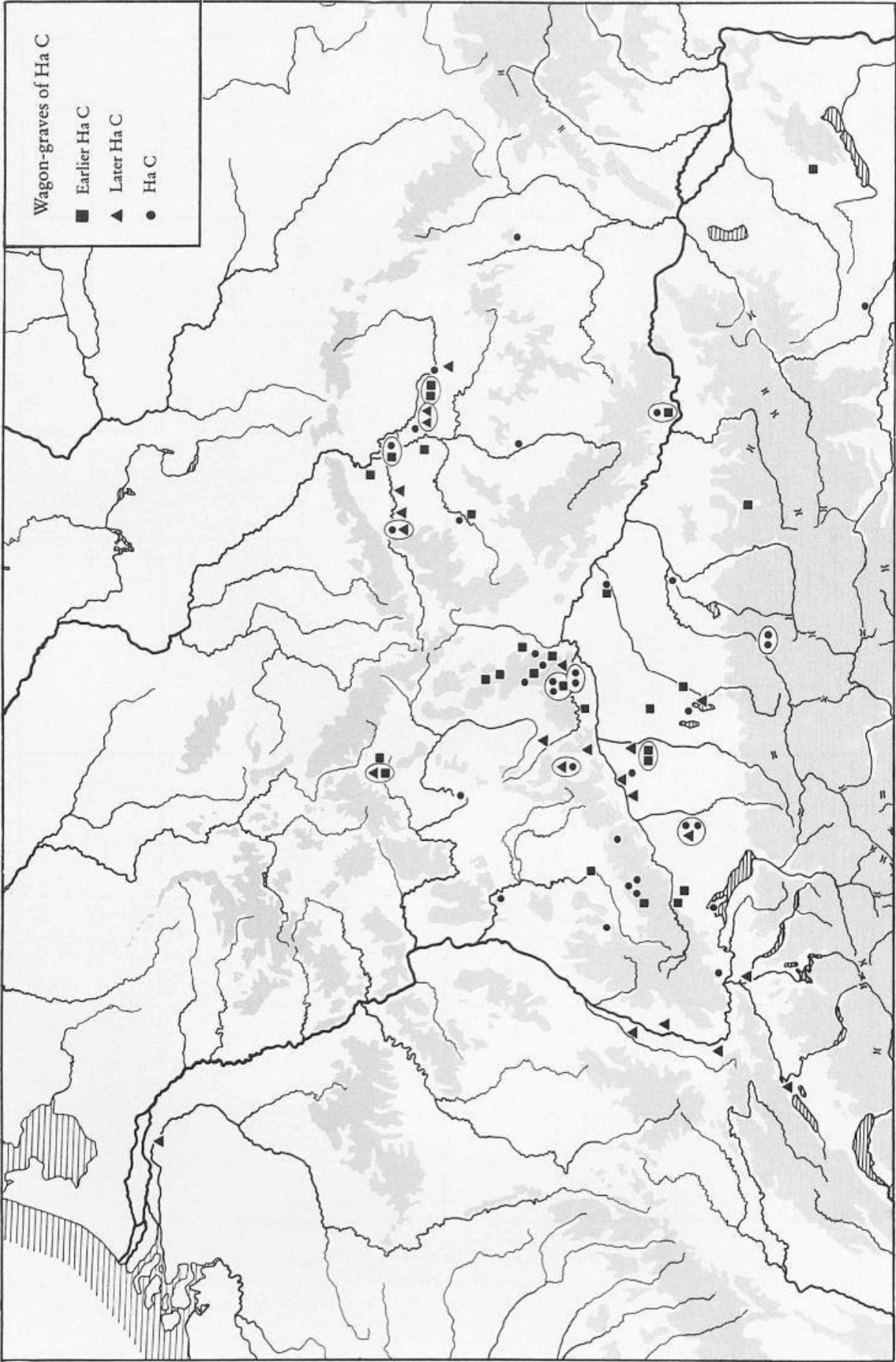


Fig. 103 The distribution of wagon-graves in Ha C (see Ch. 10.2.4 and Addendum).

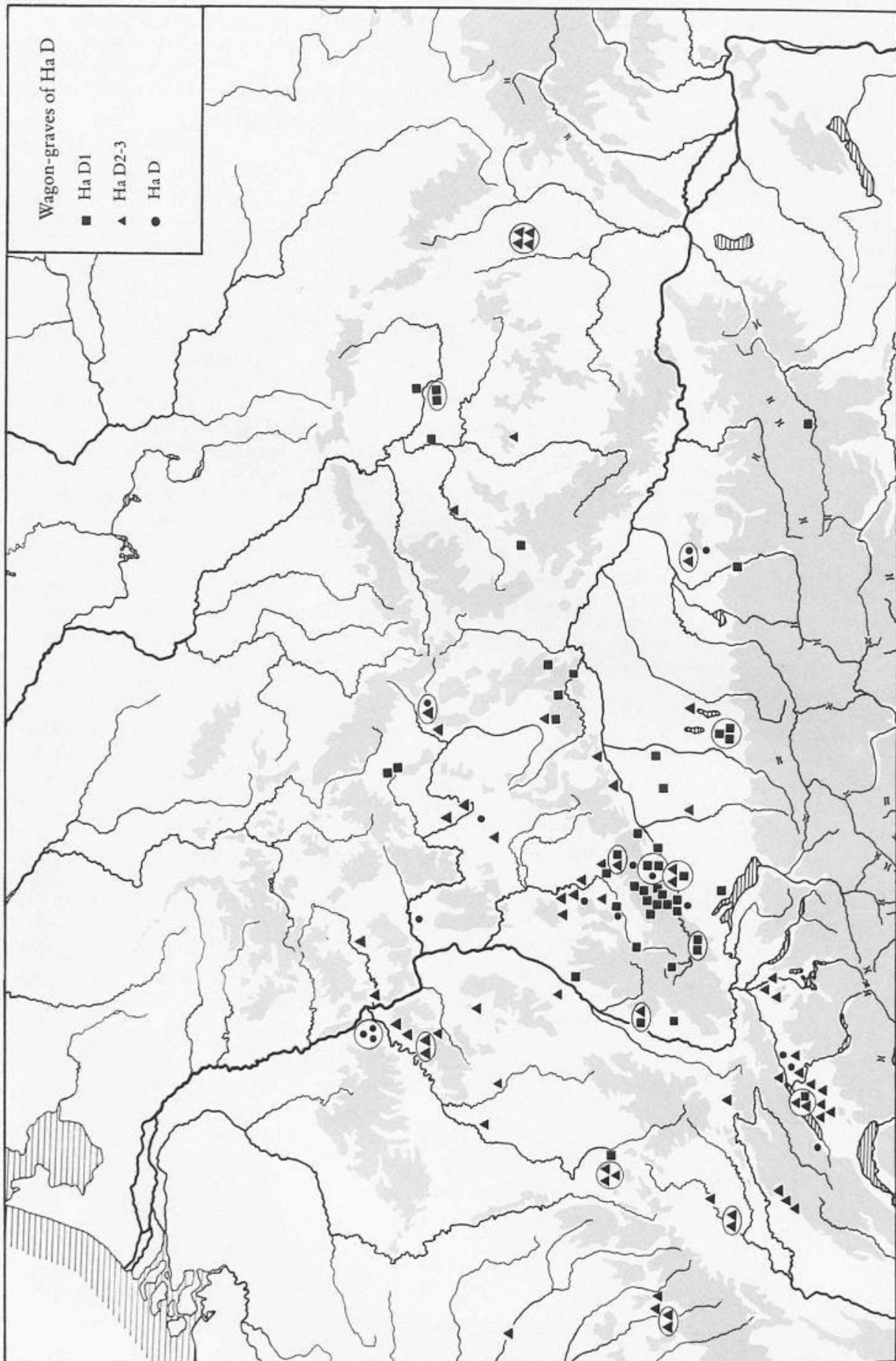


Fig. 109 The distribution of wagon-graves in Ha D (see Ch. 10.4 and Addendum).

area, too, the late Hallstatt wagon burials from Bassenheim, Bell and probably Offenbach-Rumpenheim conformed to the Hallstatt custom (Bell, Offenbach-Rumpenheim: see Driehaus 1975; information on the three Bassenheim wagon-graves was kindly provided by H.-E. Joachim). It can be no coincidence that the custom of driving the corpse feet-first appeared at the end of the Hallstatt period in the first chariot graves.

10.4 SUMMARY

The results of our chronological study are shown schematically on Fig. 107, and on two distribution maps (Figs 108–9). The chronological divisions shown on the table include an earliest horizon of Ha C characterised by Gündlingen swords (wagon type 1), an early or classic Ha C with Mindelheim swords and 'rich horse-gear' and a later part of Ha C with iron swords, simple iron harness trappings and rein-knobs with a central boss and narrow flange. The earliest Ha D phase includes wagon type 5, arched, boat-shaped and S4 fibulae and corresponds to Heuneburg period IV. Wagon type 7 was typical for the later part of Ha D (Ha D2–3). The wagon-graves of Ha D are dated as follows:

Earlier graves in Ha D: [11] Marainville-sur-Madon; [29E] Ins tumulus II/1849 (see catalogue); [48] Albstadt-Ebingen; [51A] Altheim-Heiligkreuztal, 'Hohmichele', grave I; [51B] Altheim-Heiligkreuztal, 'Hohmichele', grave VI; [53A] Bad Urach; [55] Bitz; [58] Burladingen-Gauselfingen; [60] Emerkingen; [61] Engstingen-Großengstingen; ?[65] Herbertingen-Hundersingen, 'Lehenbühl'; [68] Hügelsheim; [70A] Immendingen-Mauenheim M/3; [70B] Immendingen-Mauenheim N/3; [71] Inzigkofen-Engelswies; [72] Inzigkofen-Vilsingen; [74B] Kappel-Grafenhausen, tumulus 3; [84A] Salem, tumulus G; [87] Sankt Johann, tumulus of 1897; [88] Sigmaringen; [89C] Sigmaringen-Laiz; [92] Sulz am Neckar; [94B] Tübingen-Bebenhausen, tumulus I of 1901; [95] Ulm-Eggingen; [96] Villingen-Schwenningen, 'Magdalenenberg', grave 1; [97] Winterlingen; [103] Augsburg-Wellenburg; [104] Merkershausen; ?[106A] Beilngries, 'Im Ried-West', grave 73; [115A] Großbeibstadt, cemetery II, grave 2; [126B] Lupburg-Gottesberg, tumulus 3; [128] Nennslingen-Wengen,

tumulus 1; [141A] Uffing, tumulus 1; [141B] Uffing, tumulus 6; [141C] Uffing, tumulus 11; [144] Waltenhausen; ?[151C] Hradenín grave 18; [151E] Hradenín grave 28; [157] Nymburk; [164] Praha-Bubeneč; ?[169] Švihov-Červené Poříčí; [179] Salzburg-Taxham; [180] Strettweg;

Later graves in Ha D: [2A] Apremont grave 1; [2B] Apremont grave 2; [4] 'Burgundy'; [5] Chouilly, 'Les Jogasses', grave 16; [7] Forêt des Moidons, tumulus 2; [8] Grandvillars; [9] Hatten; [10] Ivory; [13A] Sainte-Colombe, 'tumulus de la Butte'; [13B] Sainte-Colombe, 'tumulus de la Garenne'; [14] Saraz; [15] Savoyeux; [16] Veuxhailles-sur-Aube; [17] Vix; [18] Adiswil; [19] Allenlütten; [22] Châtonnay; [23] Cordast; [25] Düdingen; ?[27] Grächwil; [28] Hermringen; [29C] Ins, tumulus VI of 1848, upper grave; [29D] Ins, tumulus VIII of 1848; [31] Payerne; ?[33] Unterlunkhofen; [34] Urtenen; [36] Wohlen; [38] Bell; [39] Hennweiler; [40A-B] Hundheim; [42] Niederweiler; [43] Oberlahnstein; [44] Weilerbach; [46] Schwalbach; [52] Asperg, 'Grafenbühl'; [53B] Bad Urach; [59] Eberdingen-Hochdorf; [62] Erkenbrechtsweiler; ?[63] Filderstadt-Plattenhardt; [64A] Herbertingen-Hundersingen, 'Gießbühl', tumulus 1, secondary grave 1; [64B] Herbertingen-Hundersingen, 'Talhau', tumulus 4; [69] Igersheim-Simmringen; [74A] Kappel-Grafenhausen, tumulus 1; [78] Ludwigsburg, 'Römerhügel'; [90] Stuttgart-Bad Cannstatt, grave 1; [109] Dillingen-Kicklingen; [111] Donauwörth; [118] Hilpoltstein-Weinsfeld; [123] Kitzingen-Repperndorf; [124] Leinach-Oberleinach; [130] Niederrieden; [137] Schesslitz-Demmelsdorf; [139] Starnberg-Mühlthal; [147B] Weismain-Görau, tumulus 3; [148] Býčí-skála cave; ?[152] Kladruby; ?[160] Opařany; [176B] Helpfau-Uttendorf, tumulus 5.

Ha D: [24] Diemerswil; [26] Fraubrunnen; [32] Rances; [37A-C] Bassenheim; [45] Offenbach-Rumpenheim; ?[50] Altheim-Heiligkreuztal 'Wald Speckhau'; [66B] Hohenstein-Oberstetten, tumulus 2; [79B] Meßkirch-Langenhart; [91] Stuttgart-Weilimdorf; [136] Riedenheim, 'Fuchsbühl'; [147A] Weismain-Görau, tumulus 1; [176A] Helpfau-Uttendorf, tumulus 2; [177] Lengau, 'Galgenholz'.

The Development of Wagon Construction in Central Europe, Wagon Workshops and Evidence of Foreign Influence in Wagon Technology

The results of our chronological study are shown schematically on Fig. 107. It was found that in the Hallstatt period a maximum of six chronological divisions could be employed, giving a relatively accurate impression of developments in wagon construction. Distribution maps of the wagons in early and late Ha C, Ha D1 and Ha D2-3 are illustrated on Figs 108-9 and, together with the distribution maps of individual wagon fittings (Ch. 4-7), allow an understanding of the complex history of wagon construction and burial.

Before describing the history of wagon construction in the Hallstatt period, it is necessary to discuss some general considerations about wagon-making workshops. Our study of wagon-making technology and of the wagons' metallic fittings has surely been sufficient to establish the high level of craftsmanship required in their construction. Indeed, we must assume the existence of specialised workshops combining the skills of several craftsmen. Hesiod, in the *Works and Days*, implied that in contrast to simple wooden objects like the plough, which could be made on the farm by the farmer, a specialist was necessary for the construction of a cart or wagon (Sandars 1962, 407). N. K. Sandars made the same point about recent wheelwrights (1962). She stressed the necessity of using seasoned wood in wagon-building, which had to be carefully selected and stored for several years. For example in the workshop which Sandars described, the craftsmen selected elm for the naves, oak or ash for the felloes and heart of oak for the spokes (for further details see Sturt 1958). The same care was spent on the wagons of the Hallstatt period: in the case of Hochdorf, for example, the felloes were of ash or elm, the spokes of maple, the naves of elm and the draught pole was made of apple or pear wood.

The wagon-making workshops must therefore have been sedentary, if only in order to select, obtain and season the required wood. This is also suggested by the consideration that ceremonial wagons were not made in large quantities and a specialist wandering craftsman or craftsmen would hardly be able to find enough customers to employ him (Schiek 1981, 288). If the wheelwright were sedentary he, along with associated bronze and iron craftsmen, must have been supported by a community – and presumably, since the function of the ceremonial wagon was partly as a status symbol both in life and in funerary customs, by a community with a relatively high level of social differentiation. The workshop would make

wagons both for local use and, political relations allowing, for neighbouring communities, allies or trading partners.

11.1 WAGON TYPE 1

To the earliest recognisable horizon of the Hallstatt period, characterised by Gündlingen swords, belongs the wagon-grave from Wehringen, 'Hexenberg', tumulus 8, containing wagon fittings of the Bad Homburg group, which are otherwise dated to the late Urnfield period. It is interesting that the Wehringen wagon represents the easternmost member of the Bad Homburg group, which is otherwise known only from the Rhineland and France (Fig. 22). This raises the question whether the Wehringen wagon embodies influence from Western Europe at the start of the Hallstatt period, which thereby perhaps indicates one of the foundations of later wagon construction. One should not forget that a number of other objects held to be contemporary with the Wehringen grave (see Ch. 10.1), such as Gündlingen swords and certain elements of horse-gear (check-pieces, phalerae) likewise betray West European ancestry. The legacy of great cultural centres of the late Urnfield period, particularly evidenced by the bronze products of the *Pfahlbaukreis*, the Nordic zone and the bronze hoards of Atlantic France, may have played an important rôle in the formation of the Hallstatt material culture. While the wide-ranging contacts evidenced by Urnfield bronzework, linking West European centres with Protovillanovan and Villanovan Italy, were doubtless disrupted at the end of the Urnfield period, they could represent an important element in the cultural changes at the start of the Early Iron Age.

11.2 EARLIER WAGONS IN HA C

Wagon type 3 entered the archaeological record along with 'rich horse-gear', Mindelheim swords and other types characteristic of Kossack's Ha C1 phase. These wagons were provided with a range of iron fittings which were quite new to Central Europe. Although they mark a clear break in the Central European wagon-making tradition, the ceremonial wagons of Ha C nevertheless have much in common with their Urnfield predecessors: in particular they were drawn by a pair of horses and had four spoked wheels. The origins of these novel wagon

fittings (felloe-clamps, iron tyres and iron nave furnishings) must be discussed in detail.

The felloe-clamps observed on Ha C wagons (see above; Fig. 58, left) provide important information for the understanding of felloe and wheel construction. This source of information was first exploited by G. Kossack in his study of the wagons from Großebstadt (1970; 1971). He was able to demonstrate the complicated composite 'Großebstadt' felloe construction for the wagons from Großebstadt, cemetery I, grave 1 and Hradenín grave 46 (Fig. 55; discussed in detail in Ch. 4.3.1). The author was able to confirm Kossack's reconstructions, and found evidence for this felloe construction on at least 21 further wagons in Central Europe (Fig. 59).

Kossack drew attention to convincing parallels for the Großebstadt felloe construction in the Near East, especially on reliefs from the reign of Ashurnasirpal II (883–859 BC). He thought in terms of an eastern origin for the new technology which might have been brought to Central Europe along with the so-called 'Thraco-Cimmerian' horizon of eastern influence (Kossack 1971, 158, fig. 35, 1). Today, especially after the work of M.A. Littauer and J.H. Crouwel, it is clear that this type of felloe construction not only began earlier, but also had a wider distribution (Littauer and Crouwel 1979; *ibid.* 1985; Crouwel 1981). A similar type of felloe, with a bipartite bent inner felloe and a four-piece outer felloe, was used on chariot A4 in Tut'ankhamūn's tomb in Thebes (Fig. 110; Littauer and Crouwel 1985, pls 5, lower; 31; Crouwel 1981, pl. 150). Crouwel's research showed that this type of construction was probably frequently used in the Mycenaean world (e.g. the wagons depicted on the Ayia Triadha sarcophagus and frescoes from Mycenae and Tiryns; Crouwel 1981, pls 32; 85; 95). The bronze wheels of the late Urnfield Coulon group, with their outer felloe composed of several wooden planks, represent the same basic principle of construction (Fig. 35). We have already remarked on the bronze fittings resembling felloe-clamps from the Bad Homburg hoard (Fig. 39), and it seems quite possible that the wooden wheels with bronze furnishings of the Bad Homburg group likewise had composite double felloes similar to the Großebstadt construction observed in the Hallstatt period. From a technological point of view, the construction of such late Urnfield wooden wheels was probably comparable with methods used in the Near East in the reign of Ashurnasirpal II – in the Near East with six spokes, in Central Europe with four, five or six spokes. The fact that the double felloes of the Hallstatt period could look back on an even longer tradition is made clear by the model bronze wheel from Tobøl, on which the felloe is divided into an outer and inner part by incised lines (Fig. 20). The complicated incised decoration on the wheel's inner felloe ring is best interpreted as bindings (perhaps leather thongs) for the felloes or spokes. The Tobøl wheel should certainly be regarded as a model of a wooden wheel,

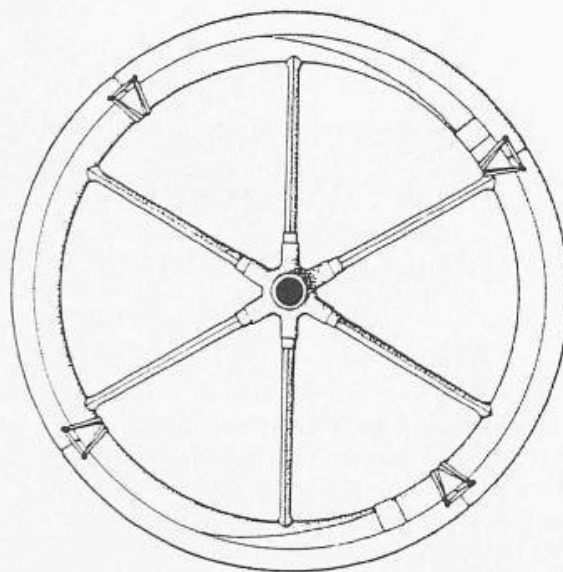


Fig. 110 Thebes, grave of Tut'ankhamūn: a wheel from chariot A4 (after Littauer and Crouwel 1979). – Not to scale.

showing details of the constructional techniques used in the Middle Bronze Age.

This short discussion of felloe construction shows how quickly technological advances could be transmitted over wide areas. The precise history of the contacts and influences, which certainly lie behind the distribution of this technology, can hardly be written owing to the paucity of information about the construction of wooden wheels. Indeed it is uncertain whether the distribution of felloes of Großebstadt type (Fig. 59) should be interpreted as evidence for Italian influence or for a continuation of Urnfield constructional techniques. For information concerning the wheels of wagon type 3, it is probably wise to restrict our discussion to their metallic furnishings.

The felloe-clamps of type 3 wagons, for example from Großebstadt, cemetery I, grave 1 and Hradenín grave 46, have parallels in the first half of the 7th century BC in Italy, for example from Veii, Monte Michele, grave 5 and the grave of 1950 from Como-Ca' Morta (Pl. 132B, 5–11; Boitani 1983, 548–9 – also visible on the grave plan). Riveted felloe-clamps also seem to have been used in Greece, judging from Kerameikos grave 13, which can be dated to the 9th century BC (Müller-Karpe 1962a, 65–6; 103, fig. 21, 13). The double felloes of the vehicles from the 7th century Salamis graves were also held together with numerous rivets and clamps in a construction which in principle seems similar to that used in contemporary Italy and Central Europe.¹ A drawing of grave 79 with chariot Δ *in situ* shows a channel in the felloe, into which the planks of the outer felloe were fitted (Fig. 111). While the felloes of Großebstadt construction betray links with their Mediterranean comparanda, the felloe fittings from

¹ Salamis grave 3, chariot B; grave 79, chariots A, B and Δ; Karageorghis 1967, pls 120–1; *ibid.* 1973, pls 247; 248; 251. It should be noted that the wheels of chariot 3B most likely had a composite outer felloe made from several wooden planks and not bent from a single piece of wood, as Karageorghis and Kossack suggested. A similar composite outer felloe is also likely for the chariots from grave 79.

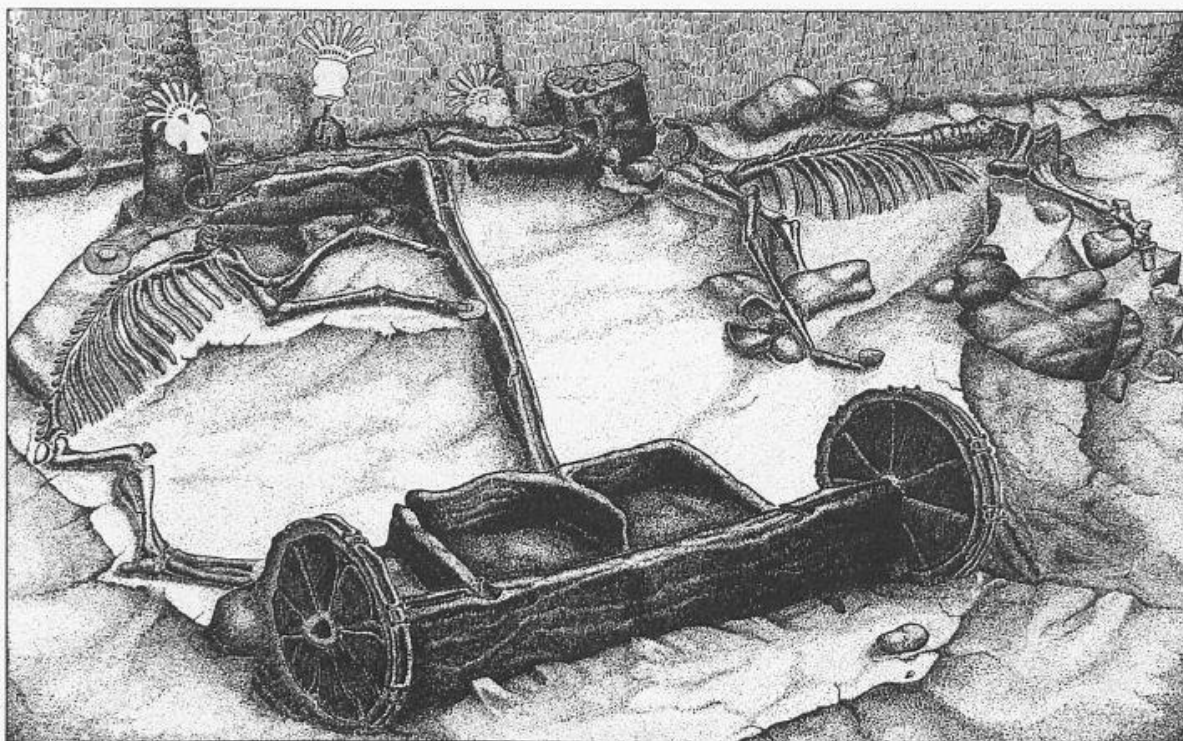


Fig. 111 Salamis, Cyprus, grave 79: drawing of chariot Δ in situ (after Karageorghis 1973).

Bad Homburg (Fig. 39) could indicate the same constructional principle. However, whether the Bad Homburg clamps can be interpreted as evidence for Mediterranean influence in the 9–8th century BC, or whether they form part of an older Central European tradition, remains uncertain.

Iron tyres were certainly something new in Ha C. Metallic tyres are found neither on wagons of the Urnfield period, nor on the wagons in Urnfield tradition from Wehringen, 'Hexenberg', tumulus 8 or La Côte-Saint-André. The tyres of these wagons were either made of a perishable material such as leather, or the felloes went unprotected. Indeed, M. Egg noted that the composite 'Großbeibstadt' felloe construction only had a practical *raison d'être* without tyres: the outer felloe segments, being exposed to considerable wear, could easily be replaced without affecting the rest of the wheel. With the introduction of iron tyres, the double felloes lost their original purpose because the tyre protected the felloe from damage (Egg 1987a, 84, note 26). At any event, whether or not the 'Großbeibstadt' construction represents an antiquated technology with a long Central European history, the characteristic tyres of type IA with close-set nails with long oval heads find good parallels in Central Italy (compare Fig. 112, A and B). Comparable tyres are known from Cerveteri, Tomba Regolini-Galassi; Vulci, chamber-grave of 1965; Populonia, Tomba dei Carri; and Fabriano, S. Maria del Campo, grave 3 of 1915

(Woytowitsch 1978). Thus the workshops which produced type IA tyres must ultimately have been inspired by Central Italian prototypes. The distribution of IA tyres (Fig. 49) is concentrated on the Upper Danube, and this was probably the region where iron tyres were first introduced to Central Europe.

The typical Ha C naves of type Breitenbronn (Fig. 60) also find their best parallels in Italy, particularly from the Tomba Regolini-Galassi in Cerveteri, as Kossack already noticed (1959, 91). These naves have a similar shape, with a cylindrical nave-neck and swollen nave-head, the only difference being that the nave-head sheathings are here made of bronze instead of iron sheet (Woytowitsch 1978, pl. 6, 30b).

There is no doubt that on wagon type 3 the tyres and naves, possibly also the felloe-clamps, demonstrate contact with Central Italy in the early 7th century BC. The higher level of technology in Central Italy, particularly in Etruria, makes it very likely that these constructional techniques were transmitted thence to Central Europe. In turn, the Etruscan wagons show signs of Oriental influence: for example the wagon-box decoration from the 'Tomba del Littore' in Vetulonia (Woytowitsch 1978, pl. 8, 59a-d) and chamber-grave 5 in Veii, 'Monte Michele' (Boitani 1983, 552, fig. 5), which are closely paralleled in Huelva, 'La Joya', grave 17 (Garrido Roiz and Orta García 1978, 78, figs 44–5), a grave-find which certainly embodies Phoenician influence.²

² In a recent lecture, F.-W. von Hase drew attention to the horse-gear from Huelva, 'La Joya', grave 17. He noticed that the rectangular cheek-pieces with loops on their upper corners (Garrido Roiz and Orta García 1978, 88, fig. 52) are comparable with a series of bronze examples from Vetulonia (von Hase 1969, pl. 7, 65–74). Clearly the Phoenicians were the agents who transmitted this type of horse-gear from the Near East to Italy (examples known from Luristan: *ibid.* 1969, 41, fig. 1, 15–17). This aspect of the Orientalising phenomenon will be treated fully in an article in preparation by von Hase (Forthcoming).

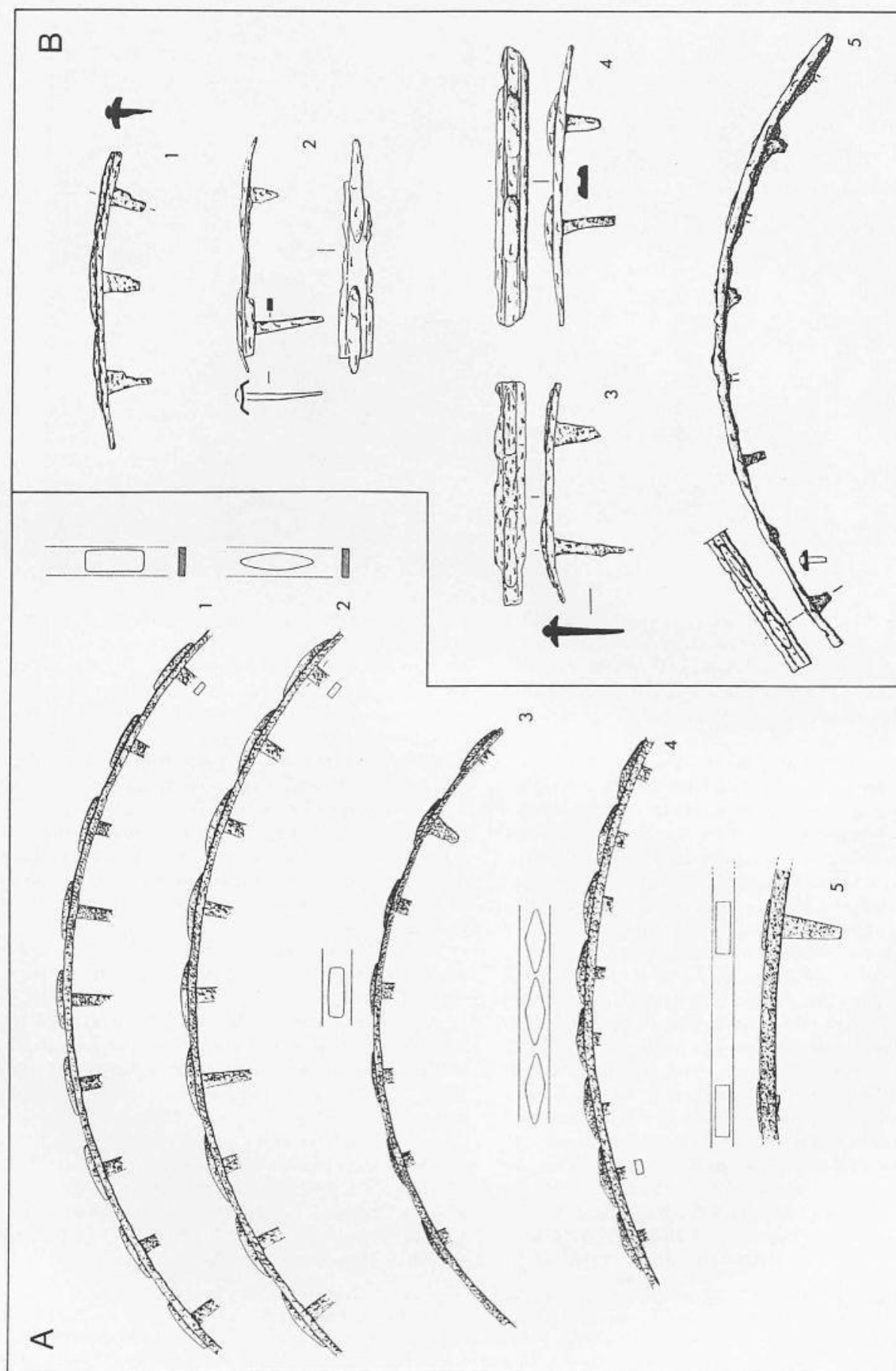


Fig. 112 A: Iron tyres from Central Italy (1.2 S. Maria del Campo, near Fabriano; 3 Vulci, chamber grave of 1965; 4 Populonia, Tomba dei Carri; 5 Cerveteri, Tomba Regolini-Galassi). B: Iron tyres from Central Europe (1 Lupburg-Gottesberg, tumulus 1; 2 Harburg-Marbach; 3 Beratzhausen grave 3; 4 Lhotka; 5 Hradetin grave 24). - A1-5 after Woytowitsch 1978. - Scale 1:4.

The foreign technological influences apparent from the wagons of type 3 can be traced back to Etruscan Italy. It is interesting to remark that the new technology, which was elsewhere developed for two-wheeled chariots, was used north of the Alps with a certain conservatism for the improvement of the traditional local four-wheeled ceremonial wagon. By contrast, parallels for the iron fittings of the Hallstatt wagon are completely lacking in Eastern Europe. Wagon finds of this period are almost unknown east of the Carpathian Basin.³ The only wagon fittings in the Carpathian Basin which could conceivably be brought into connection with 'Thraco-Cimmerian' influences are the axle-cap and linchpins from Alba Julia and 'Hungary' (Fig. 46). The heads of the linchpins are formed by openwork 'bird-cage' rattles, a type of decoration which probably reached Central Europe from the Caucasus area (Bouzek 1971). But it is very doubtful whether even these finds can be interpreted as 'steppe' influence on wagon construction; the bird-cage rattles probably comprise a new type of decoration on local types of wagon furnishings.

The iron fittings of wagon type 3 do not allow the recognition of individual workshops or workshop groups. The only fittings which could be interpreted in this way are the naves of variant II of the Breitenbronn type, characterised by the use of bronze in addition to iron sheet (Fig. 60, 114A.120.151I). The hemispherical heads of the naves from Großebstadt and Hradenín (Pls 73, 4; 113, 1), and the nave-necks sheathed with bands of bronze and iron sheet from Hradenín and Gehrsricht (Pls 77B, 1.6; 113, 1), are similar enough to indicate either direct imitation or production by the same workshop. These links between North Bavaria and Bohemia are underlined by the long-rectangular grave chambers of the Großebstadt cemeteries (e.g. Figs 184-5; 187-8).

Within the early part of Ha C, wagons of type 3 seem to have existed alongside those of type 2 (Fig. 107). Although the distribution of type 2 wagons, with concentrations in the Oberpfalz and on the Swabian Alb, is more restricted than that of type 3, the distributions are by no means mutually exclusive (Figs 87-8). One could imagine that the two sorts of wagon had different functions, but no indication for this is given by their associated grave goods. Instead it is possible that in contrast to the type 3 wagons, which betray foreign influences and novel furnishings, wagons of type 2 represent the continuation of earlier wagon-making traditions. Thus the decorative phalerae and bipartite discs of the late Urnfield Bad Homburg group (box type i) could be related to ornaments on wagon-boxes of type ii, for example from Mitterkirchen, tumulus X, grave 1 and Neu Esting (see Ch. 7.2). It was also noticed in Ch. 7.1-2 that wagon-boxes of types i and ii (typical for wagon types 1 and 2) may both have had bronze-clad wooden structures at their rear ends, for example in the case of Wehringen and Mitterkirchen. Moreover, wagons of type

2 are notable for the paucity of iron fittings – in stark contrast to wagon type 3. It is difficult to reach a conclusion about wagon type 2, mainly owing to the small number of well-excavated examples, and it remains hypothetical whether they can be regarded as more conservative, continuing Urnfield traditions.

11.3 LATER WAGONS IN HA C

The later part of Ha C saw the spread of wagon burial to the Rhine valley (Fig. 108), reaching from Switzerland (Ins) to Holland (Wijchen). While wagons of type 3 continued to be built, wagon type 2 seems to have been replaced by type 4. It was explained in Ch. 7.3 that the box decoration (box type iii) of wagon type 4 can be regarded as a development from that of wagon type 2 (box type ii). The type Ins naves of wagon type 4, however, are related to the Breitenbronn nave type, and the regular use of iron tyres also points to influence from wagon type 3.

The distribution of wagon type 4 is centred on the upper Rhine valley, with outliers on the lower Rhine (Wijchen) and in southern Germany (Aislingen; Dittenheim). The importance of this wagon type lies in its obvious links to the south, shown by the naves of type Ins, the angle-sockets and the linchpins from Wijchen.

Good parallels for the naves from Ins come from Fabriano, S. Maria del Campo, grave 3 (compare Pl. 24C with Fig. 113), dated to the second half of the 7th century

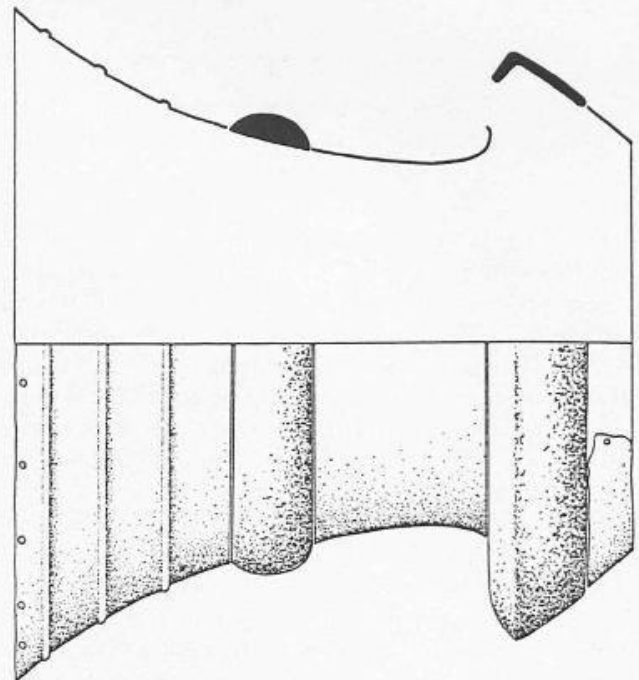


Fig. 113 Fabriano, S. Maria in Campo, tomba 3: bronze and iron nave fittings of type Ins. – Reconstruction by G. Baldelli, illustration kindly supplied by the Soprintendenza Archeologica, Ancona. – Scale 1:4.

³ The south grave from Krasnoe Znamja, Mogila 1, near Stavropol could be an exception: Kossack 1986, 127-8; Petrenko 1980; *ibid.* 1983, 47, fig. 41. Vehicle-graves are otherwise unknown in the area east of the Carpathians. This burial rite was practised, however, in the Caucasus region.

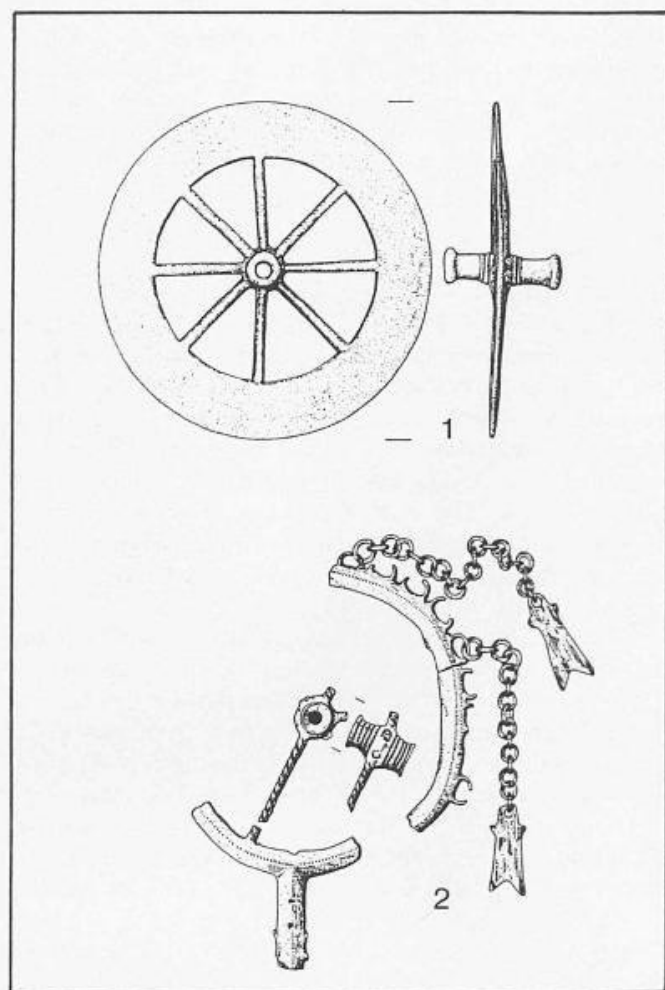


Fig. 114 Bronze wheels: 1 from the model wagon from Strettweg, 2 from a pendant from Hallstatt grave 121 (after Egg 1987b).
— Scale 1:3.

BC (see Ch. 10.2.2). The angle-sockets from Birmenstorf and Ohnenheim (Pls 14, 3.6.8–9; 24B, 2–3) belong to a series of angle-sockets dated to the 7th century BC (see for example Pl. 127C), mainly distributed south of the Alps (Fig. 76). The angle-sockets were clearly used for holding fast the corners of a wooden railing on top of the wagon-box (see the reconstruction of the Ohnenheim wagon: Egg 1987a, 95, fig. 18; 96, fig. 20; 100, fig. 23). The linchpins from Wijchen (Pls 1–3) are decorated with anthropomorphic protomes which are unique north of the Alps, but have close parallels in Central Italy.

While these finds provide secure evidence of contact with Italy, they each require a careful interpretation. Whereas the Ins nave is similar to the Fabriano example, its nave-head corresponds to that of the Breitenbronn type and surely indicates local production. The conical nave-neck sheathing with three ribs on the Ins and Fabriano naves is seen earlier in Ha C in Central Europe, in bronze

sheet from Dýšina (Pl. 108A), and in iron from Lhotka (Pl. 117, 5), and is also known from a number of other Italian graves: Populonia, 'Tomba dei Carri' (Woytowitsch 1978, pl. 9, 67a); Castellina in Chianti (*ibid.* pl. 11, 68u). A similar form of nave may be represented by some model wheels, from Strettweg (Fig. 114, 1), Hallstatt grave 121 (Fig. 114, 2) and Glasinac (Seewald 1939, pl. 3, 1b). Presumably this type of nave was known over a wide area and was imitated both on full-sized and model wagons. But the extremely close similarity between the Ins and Fabriano naves (Pl. 24C; Fig. 113) shows direct contact between craftsmen. And the evidence suggests that the Fabriano wheels were made by craftsmen who normally worked in regions north of the Alps.

As for the angle-sockets, the exact form of the pieces from Birmenstorf and Ohnenheim (Pls 14, 3.6.8–9; 24B, 2–3), with their hexagonal or octagonal cross-section, is unknown in Italy. However, they have holes on one side to hold openwork bronze box decoration, a feature found on every other angle-socket (see for example Palestrina, tomba Bernardini: Emiliozzi 1988, 295, figs 5–7). The Italian and Central European angle-sockets seem to share the same basic design, although none of the fittings from wagons of type 4 can be regarded as direct imports from Italy.

The trident-shaped form of the Wijchen linchpins (Pls 1–3) has parallels in South German graves: Gottesberg tumulus 1 (Pl. 84A, 1–5.7–9), Markhof tumulus of 1887 (Pl. 89A, 4) and probably also Kappel-Grafenhausen tumulus 3 of 1976 (Pl. 42, 6). While the Wijchen linchpins clearly stand in a Central European tradition and were presumably made there, the anthropomorphic protomes are unthinkable without influence from Central Italy. The complicated hairstyles of the Wijchen protomes, in particular the long plaits, are most characteristic elements and can only be compared with the 'back braids' seen on representations of Etruscan women (Bonfante 1976). The closest Etruscan parallels include a female figure made of ivory from the 'Circolo della Fibula' in Marsiliana d'Albegna (7th century BC: Bonfante 1976, pl. 4, f–g) and amber female figures from the 'Circolo dei Monili', Vetulonia⁴ (Fig. 115). Another characteristic feature can be seen on Pl. 3, where the ears are formed by short tubular protruberances, again found on the figures from the 'Circolo dei Monili' (Fig. 115). Of course, the Wijchen protomes are more crudely executed than the Etruscan comparanda, particularly on three linchpins where the mouth is expressed by simple crossed lines, and this again points to the fact that the linchpins were made north of the Alps. Now while it is argued that the Wijchen protomes are foreign in character, it is interesting to note that the linchpins from Gottesberg seem to have had space for organic protomes on the upper ends of the trident forks (Pl. 84A, 1.3–4). But even if trident-shaped linchpins with anthropomorphic protomes can be regarded as a Central

⁴ I would like to thank F.-W. von Hase for drawing my attention to the amber figurines from the 'Circolo dei Monili'. The linchpins are discussed in an article by von Hase (von Hase 1989). More general parallels from Etruria can be seen in the following illustrations: Bonacelli 1932, pls 14–5; Richardson 1962, pls 2–22; Rebuffat-Emmanuel 1967, pls 132–6. Rather similar bronze figures in Hungary, from 'Ószöny' and Nyergesújfalu, probably themselves represent Italian influence (Szabó 1982, 225, figs 4–7; 233, figs 22–3).

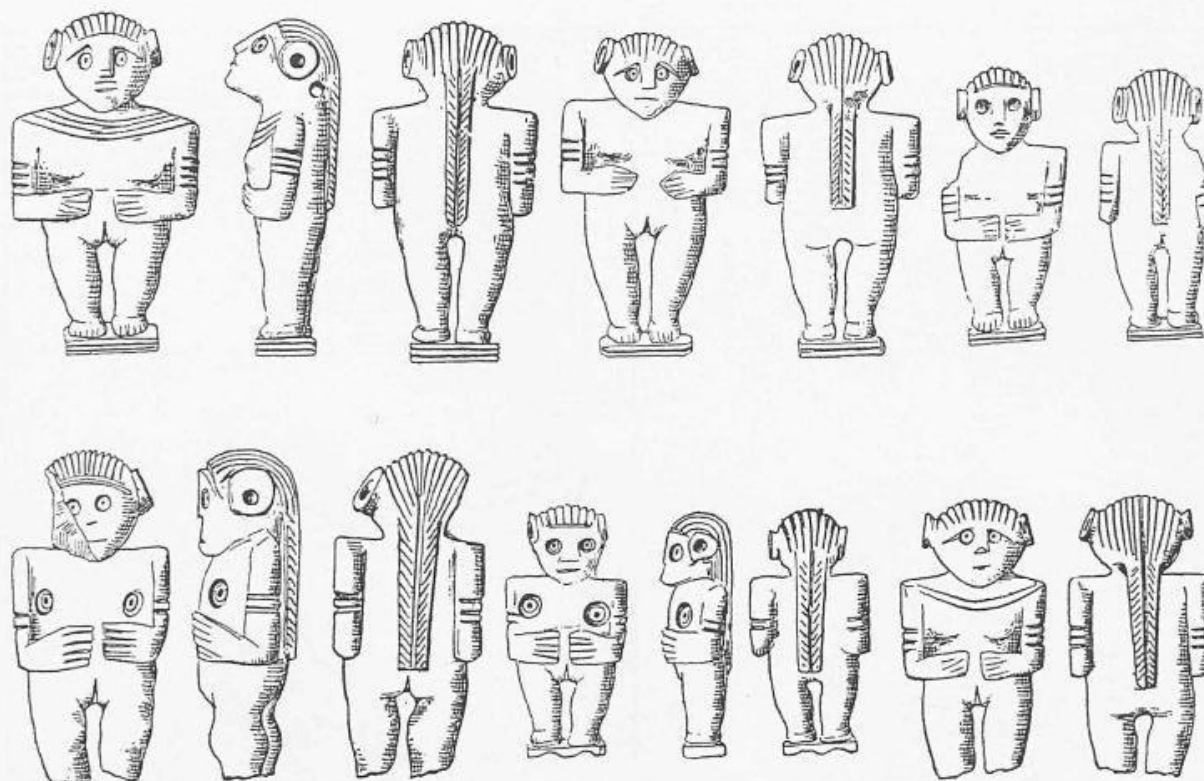


Fig. 115 Amber figurines from Velutonia, Circolo dei Monili (after Milani 1905). – Scale 1:1.

European fashion, the Wijchen heads show elements of Etruscan taste and fashion which were otherwise unknown north of the Alps.

The contacts of wagon type 4 with Italy in no case indicate direct imports to the area north of the Alps. Instead we can conclude that Central Italian fashions or technological advances were imitated in Central Europe, without being able to be more precise about the mechanisms by which the influences were transmitted. Presumably we may imagine the formation of a local wagon-making workshop tradition centred on the upper Rhine and eastern Switzerland, which was open to foreign influences. This should be compared with the later adoption of fibulae and antenna-hilted daggers which, among other routes, could have reached Central Europe via the Great St. Bernard and St. Gotthard passes (Pauli 1971, maps 1; 3; 5; 6; Schiek 1981, 300–301; 296–7, fig. 15 – red symbols: distribution of S4 fibulae; Sievers 1982, 55; pl. 42, A–B).

The grave from Wijchen deserves to be mentioned again with regard to its remote position on the lower Rhine. Apart from the fittings of a type 4 wagon, the grave contained elaborate horse-gear, a socketed bronze axe and an imported ribbed bucket of Stjernquist's

Ancona or Novilara group (see Ch. 10.2.2). These grave goods, as well as those from other rich graves such as Oss (Modderman 1964), Meerlo (Verwers no date) and Haps (iron dagger: Bloemers et al. 1986, 62–3) testify to the wealth and wide-ranging contacts of south-east Holland during the Hallstatt period (Fig. 116, 1). A welcome explanation for this is provided by recent research on salt production on the Dutch coast (Simons 1987, with further references). The distribution of a specific type of half-cylindrical *briquetage* shows how the salt was traded in the late Hallstatt and early La Tène periods along the valleys of the Meuse and Rhine, with particularly numerous fragments being found by excavations in the Rhenish brown-coal region between Cologne and Aachen (Fig. 116, 2). It is most plausible that salt trading was already under way in Ha C, presumably without the typical half-cylindrical *briquetage* containers which later came into use.⁵ The original extent of this salt trade is impossible to estimate, but judging from the exotic objects found in some rich Dutch graves the salt producers must have had contacts with the area north of the Alps. According to these considerations the Wijchen wagon was probably sent north, perhaps as a gift from a trading partner further up the Rhine.

⁵ Recent excavations in Holland have now uncovered half-cylindrical *briquetage* dating back to the earlier Hallstatt period (Ha C). The author is grateful to N. Roymans, Amsterdam, for information on these new finds. The following sites are mapped on Fig. 116, 1: Baarlo, Datteln, Ede, Meppen/Zweelo, Rekem, Wijshagen (for these sites, see Kimmig 1963; Bloemers et al. 1986, 62–3; van Impe 1980; Nouwen and Van de Konijnenburg 1987, 27–33); Meerlo, Oss, Overasselt (for these sites, see Appendix); Wijchen (see catalogue).

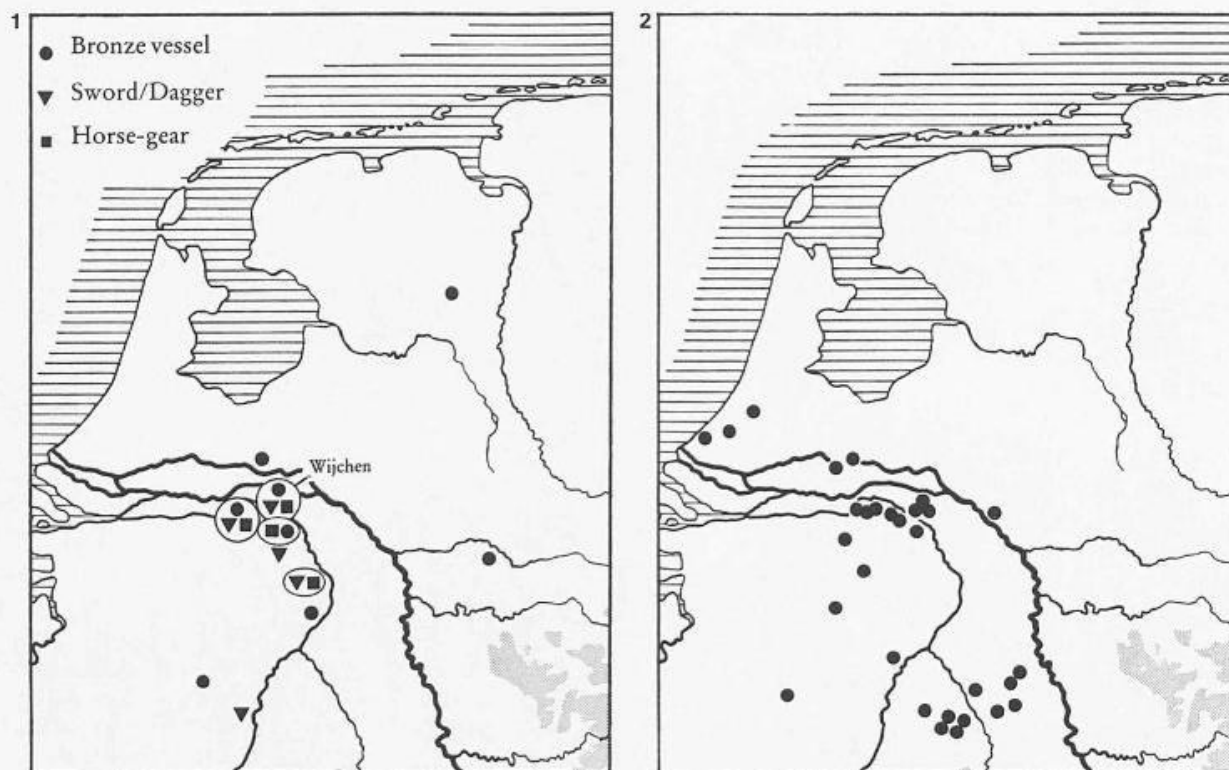


Fig. 116 1 The distribution of bronze vessels, swords and horse-gear in graves of the Hallstatt period¹ (for a list and references, see p. 171, note 5), 2 The distribution of salt briquetage (after Simons 1987).

11.4 EARLIER WAGONS IN HA D

The naves of wagon type 5 are a characteristic feature of Ha D1. Their conical bronze sheet nave-neck sheathings betray links with the naves of type Ins and the heads of some of the naves are related to those of types Ins and Breitenbronn. The typical tyres of wagon type 5, with large rectangular nail heads (type VC) were presumably developed from the tyres of type IA on which the nail heads were also large, but long and oval in shape (compare for example Pls 55A and 75B, 5). We may conclude that the type 5 wagons were a local development from those of Ha C. The two wagons with naves of type Breitenbronn variant I, dated to Ha D1, indicate that wagons of types 3 and 5 for a time existed side by side, suggesting that the wagons of Ha D1 were the product of a gradual evolution. Nevertheless, the transition from Ha C to D is marked by the disappearance of older forms (wagon types 3 and 4) and their replacement by a range of new wagon fittings (wagon types 5, 6 and 7 – see Fig. 107). At the same time the transition to Ha D marked the end of the production of felloes of Großebstadt type and from Ha D onwards the single-piece bent felloe was generally used for chariots and ceremonial wagons.

Ha D1 saw a radical change in the distribution of wagon burial, which now enjoyed a remarkable popularity on the Swabian Alb (Fig. 109). The bulk of the wagons on the Swabian Alb were of type 5 which, judging from their distribution (Fig. 90) were doubtless made there. S.

Schick (1981, 286–8) noticed that the complicated fittings of the conical naves of wagon type 5 allow certain conclusions about the workshops which produced them (Fig. 68). In particular, he drew attention to the close similarity of the naves from Hügelsheim, Vilsingen and Ebingen (our type Vilsingen). We should also mention the very characteristic nave fittings of types Erkenbrechtsweiler and Winterlingen.

The wagons from Hradenín grave 28 and Nymburk are the most distant outliers of the concentrated distribution of wagon type 5 on the Swabian Alb (Fig. 90). Their naves of type Erkenbrechtsweiler, the type VC tyres from Nymburk and the type iv box fittings from Hradenín are completely isolated in Bohemia, as a study of Figs 50, 68 and 77 shows. Now the fact that there are two very similar wagons close together in Bohemia makes it difficult to interpret them as princely gifts. While it is by no means unlikely that wagons were sent as gifts, perhaps to strengthen diplomatic or economic relationships, the distribution of wagon type 5 (Fig. 90) shows that this could only have taken place very rarely. While it is possible that both wagons were sent to Bohemia from workshops on the Swabian Alb, it is perhaps more likely that the wagons from Hradenín grave 28 and Nymburk were produced in Bohemia by a workshop originating from south-west Germany (the isolated position of the type Ins nave from Fabriano, Fig. 113, suggests a similar explanation – see above). Whether the craftsman or

craftsmen travelled to Bohemia on their own accord, or whether they were sent there as an object of exchange or specially in order to make these wagons, is a matter of speculation. The type 5 wagons from Uffing, Hügelsheim, Kappel-Grafenhausen and Marainville-sur-Madon raise the same questions.

We have already discussed a similar problem on the lower Rhine. It was concluded that the wealth of the rich graves on the lower Rhine and Meuse could be explained by a trade in salt, probably mainly with regions further up the Rhine valley (Fig. 116). In this case, it seemed that the underlying reason for the presence of a wagon of type 4 at Wijchen must have been economic or political in character, presumably connected with the salt trade. Analogous reasons might lie behind the type 5 wagons from Hradenín, Nymburk, Uffing, Hügelsheim, Kappel and Marainville but it is at present impossible to reinforce such a hypothesis, owing to our ignorance of the economic and political relations of the areas involved. The discovery of a large settlement at Poříčany, near Nymburk, with traces of industrial activity including the working of Baltic amber, could help to illustrate trading links, perhaps involving amber, between Central Bohemia and south-west Germany (Čtverák 1986). For the north-west Alpine area we should think in terms of relations between emergent political centres, which were to attain a dominant position in the later part of Ha D.

In Ch. 10.3 we noted in Ha D1, apart from the wagons of type 5, the appearance of wagon types 6 and 7. These wagons were to replace wagon type 5 in the later part of Ha D. The workshop of the wagon from Hohmichele grave VI must have played a part in these developments. The nave already has an angular iron nave-stock ring and a cylindrical nave-head with flat outer surface and the wheels had wide flat tyres of type VII, features which were characteristic of the later types of wagons. The exact chronological position of Uttendorf tumulus 2, with similar nave fittings and tyres, is unknown but this wagon could indicate close links in Ha D1 between the Mattigtal and the upper Danube, links which are underlined by the inlaid bronze decoration on the Uttendorf nave-head ring (see Egg 1985a, 333, fig. 7) and by the disc-headed socket apparently from 'Siedelberg', not far from the Uttendorf cemetery (an element of type iv wagon-box decoration: *ibid.* 1985b, 300, fig. 24, 1). The strong western links of the Mattigtal community are made quite evident later in Ha D by the princely grave from Uttendorf tumulus 5, with its gold neck-ring, iron belt-sheet and wagon of type 7 (Egg 1985a, 383–5).

11.5 LATER WAGONS IN HA D

The later part of Ha D saw the spread of wagon burial to areas in which wagon-graves were previously unknown: western Switzerland, the Jura and Burgundy regions of eastern France and the Middle Rhine area. The various types and variants of fittings furnish evidence for the existence of a number of different wagon-making regions, each producing its individual types of wagons.

The most elaborate wagons, with easily recognisable wheel and box fittings, were of type 7, with ribbed naves of type Cannstatt. These wagons are most frequent in Württemberg, where two concentrations can be distinguished: around the Hohenasperg and Heuneburg princely settlements (Fig. 91). It is very likely that wagon type 7 was also developed in this area of south-west Germany, judging from the typological forerunners of the type from the Hohmichele, Augsburg-Wellenburg and Offenburg-Rumpenheim. It is also possible that the naves with flat iron band decoration instead of ribbing, from Meßkirch-Langenhart, Hochdorf, Kappel-Grafenhausen tumulus 1 and Quinçay, represent an early variant within wagon type 7, again supporting a south-west German origin for this type.

Bearing these arguments in mind and considering that wagon burial was hardly known before Ha D2 west and south-west of the Rhine, it is difficult to avoid the conclusion that the wagons of type 7 found in Switzerland, the French Jura, Burgundy and the Middle Rhine owed their appearance in these areas to influence from south-west Germany. This is of considerable importance because wagons of type 7 are characteristic for, and mainly restricted to, princely burials.

This is best demonstrated by a distribution map showing type 7 wagons and gold neck-rings and bracelets (Fig. 117). The distributions of gold jewellery and of wagon type 7 correspond very closely – regularly being found in the same graves – and cluster around princely settlements. Around the Hohenasperg there are the graves from Hochdorf, Ludwigsburg, Bad Cannstatt and Asperg (F. Fischer 1979, pl. 2) and from the cemeteries of the Heuneburg come the type 7 wagons from the Gießübel-Talhau tumuli (*ibid.* pl. 1). The wagon-grave from Allenlütten, with a gold neck-ring and type 7 wagon, is situated in the region of the princely settlement of Châtillon-sur-Glâne (see Kimmig 1983, 15, fig. 28; alternatively the Allenlütten grave could have belonged to the territory of the Mont Vully settlement). The princely settlement indicated by the two graves from Apremont, 'tumulus de la Motte', both with type 7 wagons and gold neck-rings (Fig. 118), cannot be located with certainty (Pare, 1989b). Kimmig suspected that the settlement was situated on the castle hill of the present-day city of Gray, in which case the remains of the prehistoric site must have been destroyed, as they were on the Hohenasperg (Kimmig 1969, 105, fig. 5). The graves from Veuxhaules and Sainte-Colombe, one of the latter with magnificent gold bracelets and ear-rings, were grouped around the princely settlement on the Mont Lassois (*ibid.* 100, fig. 2). The situation of the princely grave from Kappel-Grafenhausen tumulus 1, again with a type 7 wagon and gold neck-ring, has been discussed by Kimmig (*ibid.* 1969, 107). The grave may have belonged to the territory of the Breisach settlement, although its distance of 20 km from Breisach makes this unlikely (*ibid.* 1969, 106, fig. 6).

It is impossible today to draw definite conclusions about the Üetliberg settlement in Kanton Zürich. However, W. Drack and W. Kimmig have drawn attention to a number of indications giving grounds for a

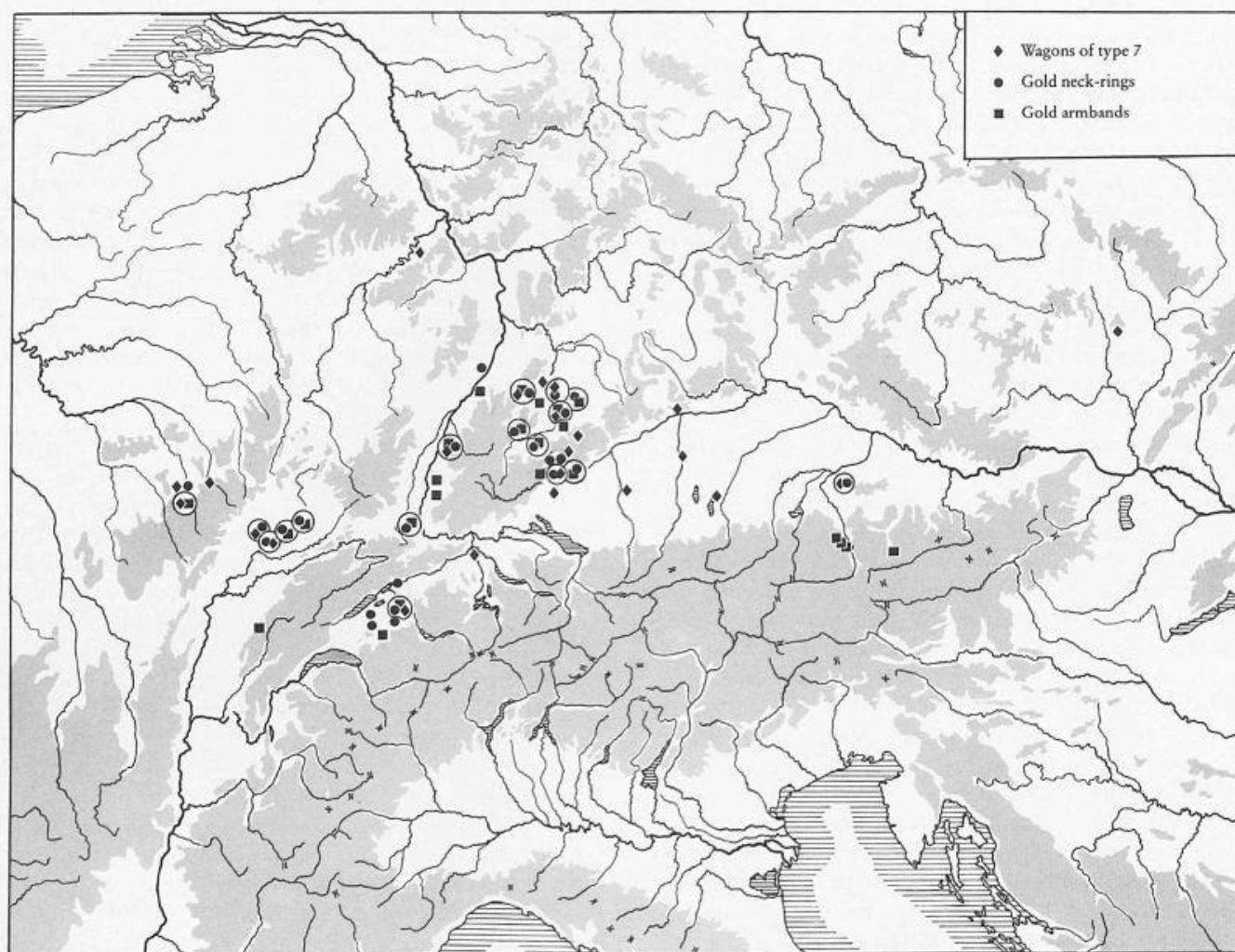


Fig. 117 The distribution of graves with wagon fittings of type 7, gold neck-rings and gold arm-bands.

strong suspicion that further excavation will reveal a princely settlement (Drack 1981; Kimmig 1983). This is important for our discussion because of the axle-cap of type Wellenburg found in the cemetery of Wohlen, not far from the Üetliberg (Fig. 72, 16). While the axle-cap could not be assigned to any particular grave, the Wohlen cemetery generally is characterised by rich burials, with numerous bronze vessels (Drack 1977; Kimmig 1983, 9, fig. 17). Indeed, the distribution of Swiss graves with bronze vessels shows a concentration around the Üetliberg, counterbalancing a second concentration in western Switzerland in the region of the Châtillon-sur-Glâne princely settlement.⁶ Among the finds which underline the special position of the Üetliberg, a sherd of a large Attic black-figured 'colonette' crater and local imitations of Italic wheel-made ware ('*Rippen-Riefen-Ware*') deserve to be mentioned first (Kimmig 1983, 10, fig. 18; 18, fig. 35, 4). The robbed La Tène A princely grave from the Üetliberg (Drack 1981), and the famous gold bowl with point-boss decoration from Zürich-Altstetten (Kimmig 1983, 10, fig. 19), situated just below the Üetliberg

settlement, could be the first hints of a princely cemetery. Although we are still relatively ill-informed about the status of the Üetliberg and its surrounding graves, our discussion has shown that the remains of a type 7 wagon from Wohlen might once again document the presence of this type of wagon in a princely ambience.

We have already mentioned the wagon fittings from Uttendorf tumulus 2, including a nave fragment best compared with the example from Hohmichele grave VI (Pls 28A; 29; 128, 2). The wagon from tumulus 5 shows that contact between Uttendorf and the north-west Alpine area was maintained and intensified later in Ha D (Pls 129; 130A). Among the other objects from the Uttendorf cemetery which document these contacts (see for example Egg 1985a, 362, fig. 31), the gold neck-ring from tumulus 5 is of greatest importance. This type of neck-ring is the most characteristic status symbol of the highest social class, evidenced in the area north-west of the Alps (south-west Germany, Switzerland, eastern France) by princely settlements and graves. A strict social hierarchy of this sort does not seem to have existed further

⁶ Drack 1981, 25, fig. 46; *ibid.* 1977, 103. The three newly-excavated tumuli from Bonstetten, close to the Üetliberg, contained four bronze vessels and should be added to Drack's distribution map of bronze vessels. See Drack 1985.

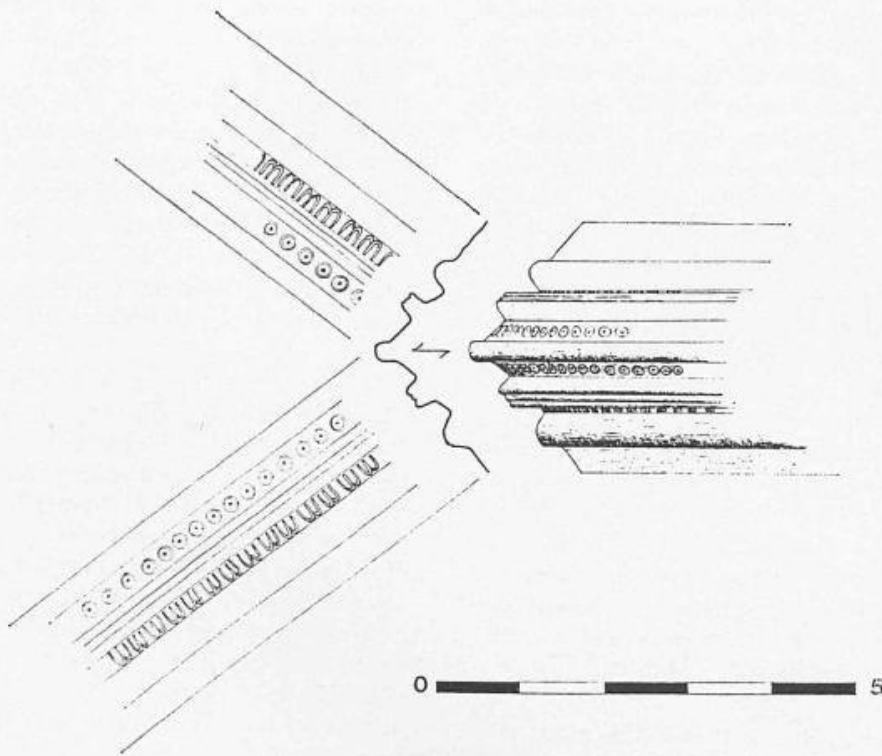


Fig. 118 The gold neck-ring from Apremont grave 2 (after Joffroy 1969).

to the east, in Bavaria, Bohemia or Upper Austria, and the Uttendorf example is quite isolated (Fig. 117). Obviously the Uttendorf community was rather special and, if not rising to the level of the great princely centres far to the west, was able to imitate certain parts of their princely culture. The reasons for Uttendorf's wealth and western contacts seem to have been twofold: 1) the proximity to the salt-mines of Hallstatt and the Dürrnberg bei Hallein and 2) the position at the junction of two important trade-routes, running north-south and east-west (Pauli 1974, 117, fig. 1; Egg 1985a, 383–5; 384, fig. 44). It is hard to escape the conclusion that the Uttendorf community was involved in the salt trade. Indeed, judging from the grave finds, one might suppose that the trade was predominantly with trading partners to the west (note also the western contacts of this area shown by the distribution of the 'Estavayer-le-Lac' dagger variant: Egg 1985b, 304, fig. 26). While one could suggest that the gold neck-ring and type 7 wagon were sent to Uttendorf in exchange for the delivery of salt, some details of both objects urge caution. Thus M. Egg noted that loop and button fastening is not found on neck-rings north-west of the Alps and both the decoration and gold alloy of the Uttendorf example are rather atypical (Egg 1985a, 349–55). As for the wagon, the nailing of the tyres (Pl. 130A, 1.4) and the half-cylinders with notched decoration on the nave-necks (Pls 129, 1; 130A, 2) are quite exceptional. However, these considerations remain inconclusive because of the great typological variety among the gold neck-rings and type 7 wagons in the area north-west of the Alps. Whether the neck-ring and wagon were imports or imitations, they owe their presence in Utten-

dorf to contact with and influence from the zone of princely culture north-west of the Alps.

We can only speculate whether the graves with type 7 wagons from Starnberg-Mühlthal (Pl. 89B, 1) and Donauwörth (Pl. 70B, 1–3.5–7) likewise indicate trading relations with the north-west alpine area. Because the associated grave goods were in both cases lost, due to grave robbing or poor excavation, it is impossible to reach more definite conclusions.

The most remarkable group of type 7 wagons was found in the Býčí-skála cave, including fittings from at least four examples (Pls 100–104; 105, 1.4–5.7–9; 106). In addition the cave seems to have contained the remains of a wagon of type 3 (Pl. 105, 2). The position of the Býčí-skála cave is exceptional in the distributions of both wagon types (Figs 88; 91). Now the exceptional nature of these finds is of course due partly to the complete lack of wagon-graves in Moravia: the Býčí-skála cave is best interpreted as a sanctuary and the Blatec Kocanda nave-cap came from a settlement pit (Fig. 155). It is therefore difficult to be certain about the rôle of the ceremonial wagon in Moravia and impossible to know with which metallic fittings they were normally provided. However it seems indicative that, when found, the wagon fittings correspond to western types – implying that there was no local tradition of ceremonial wagon construction in Moravia. In the light of these arguments, the type 7 wagons from Býčí-skála must be interpreted as evidence of western influence. The question arises whether they were imported or made locally in Moravia. If they were made locally, then wagon-making specialists must have travelled to Moravia more than once: probably in Ha C to

make the type 3 wagon and several times in a later part of Ha D to make the type 7 wagons (the type 7 wagon fittings vary so widely stylistically that different workshops certainly seem to have been involved). Alternatively the wagons could have been sent to Moravia from the west. The wagons were of course finally deposited in the Býčí-skála cave, but it is uncertain whether they had previously been used in cult activities connected with the sanctuary, or if they were donated by local chiefs. The former possibility seems more likely and explains the relatively large number of wagons, which may have been deposited in the sanctuary as worn-out cult equipment.

Apart from wagons of type 7, a range of other local wagon-making traditions are documented in Ha D by wagon type 6. These regional workshop groups are shown best by the distribution maps of the various nave types: the Repperndorf type is concentrated on the Main, with outliers on the Vltava and upper Danube (Fig. 69), the three wagons with type Kicklingen naves are found in northern Bavaria (Fig. 69) and wagons with naves of type Grandvillars or with simple iron nave-caps are located in Switzerland, the French Jura and the Middle Rhine area (Fig. 70 – note that the four wagons east of the Rhine are all of questionable type). The existence of the latter, west Rhenish workshops is underlined by tyre typology. Tyre nails with large round heads are almost completely restricted to the regions left of the Rhine (Fig. 51). The single exception to this rule, from the Býčí-skála cave, could even indicate west Rhenish workshop influences (Pl. 101).

It is interesting to compare the type 6 wagon-making centres, and their associated regional cultural groups, with the distribution of wagon type 7. Presumably the spread of wagon type 7 reflects relations (including those of a political, economic or religious kind) with the princely settlements of the north-west Alpine area. It almost seems as if wagons of type 7 were restricted to the richest social group, including gold neck-ring wearers, and the type 6 wagons may have been used by groups which were unable to obtain the most exclusive status emblems. Indeed, influence from the north-west Alpine zone of princely culture is also evident in other classes of artefact – including the painted pottery which now appears in North Bavarian wagon-graves (Repperndorf and Riedenheim: Pl. 82, 1; Voß 1984, 384, fig. 1; Wamser 1981a, 259, figure).

Apart from the new workshop traditions we could detect in the later part of Ha D, the radically different distribution of wagon-graves is also very striking. On Fig. 109 we can see that wide areas, particularly west of the Rhine, now practised wagon burial for the first time in the Hallstatt period. We should also note the general lack of wagon-graves on the Swabian Alb, in the Oberpfalz and in Bohemia. After a strong tradition of wagon burial from early Ha C to Ha D1, these three areas gave up the burial rite, whereas in neighbouring areas wagon burial enjoyed a new *floruit*, above all with the princely graves with type 7 wagons.

In my opinion the explanation of this development lies in the increasing exclusivity of wagon burial (see Ch. 12.4). Thus in Ha C the rite was widespread, either expressed by true wagon-graves, *pars pro toto* depositions of linchpins, or graves with paired horse harness or yokes, and certainly not restricted to a small social group. The distribution maps on Figs 108, 109 and 135 reflect this: in certain regions, especially in Ha C and D1, showing numerous wagon-graves with a diffuse distribution. In the later part of Ha D, in contrast, *pars pro toto* representation of wagon burial (by the provision of linchpins, horse-gear etc.) was no longer practised. Instead in the last phases of the Hallstatt period wagon-graves were relatively rare, and seem to cluster around centres of political importance. The best examples for this are the princely settlements of the Hohenasperg, Heuneburg, Mont Lassois and Châtillon-sur-Glâne. Perhaps we could add the Üetliberg, Château-sur-Salins, Britzgyberg, Breisach and the Marienberg in Würzburg. Otherwise wagon-graves seem to be concentrated in areas of economic importance, for example the Middle Rhine (?iron) and the Mattigtal in Upper Austria (salt).

It is tempting to see these changes as a reflection of social and economic developments within the Hallstatt period, perhaps leading to the formation of an elevated social élite exercising power from a relatively small number of political centres (see Ch. 12.4). Certain objects, like gold neck-rings or ceremonial wagons, may then have been reserved as emblems of status – imitated by trading partners or political allies of equal status, but presumably limited to this exclusive level of society.

The Use of the Ceremonial Wagon in the Urnfield and Hallstatt Periods

In this chapter the practice of wagon burial in the Urnfield and Hallstatt periods will be examined against the background of other evidence of wagon use. The most important questions to be discussed involve the relationship between the Central European wagon-graves of the Hallstatt and Urnfield periods, and possible links with those of Villanovan and Etruscan Italy. Bearing in mind the uninterrupted construction of four-wheeled ceremonial wagons in Central Europe for over eight centuries, it seems worthwhile to make a detailed study of the archaeological record to detect signs of continuity and change in wagon use. We are able to establish a widespread and continuous European tradition of ceremonial wagon usage which was, according to the time and place, reflected in the archaeological record in different ways: the various modes of deposition testifying to the rôle of the wagon in different activities. On the other hand we must take into account the effects of foreign influence which may have led to a break in ceremonial and cult traditions, particularly at the transition from the Urnfield to the Hallstatt periods.

12.1 THE WAGON FINDS OF THE EARLIER URNFIELD PERIOD (Br D and Ha A) AND THE ROLE OF THE WAGON IN URNFIELD SYMBOLISM

We have been able to find some evidence for Mycenaean influence in the introduction of the Bronze Age chariot into Central Europe (Ch. 2) and, later, in the technology of wheel construction (Ch. 3.1). But the start of the Urnfield period saw the development of the elaborate four-wheeled ceremonial wagon which thereafter, for many centuries, represented an important element of Central European culture. A small number of wagon burials from an early part of the Urnfield period remain one of our most important sources of information on this tradition and will now be described in detail.

The 11 wagon-graves with fittings of the Hart a. d. Alz group have already been listed and discussed in Ch. 3.3 (for an interim report on the newly-discovered twelfth grave from Poing, see Winghart 1989). This group of graves represents a closely related burial custom shown by: 1) the short duration of the rite, mainly restricted to the early and older Urnfield period and 2) the compact distribution of the graves, reaching from Lake Geneva to the Chiemgau.

Wagon-graves are otherwise completely unknown in Europe both in the Bronze Age and in the Urnfield period. Likewise horse-gear, represented in more than half the wagon-graves of the Hart a. d. Alz group, was very rarely provided in other graves before the Hallstatt period. West of the Carpathians, Bronze Age bridlery is only known from Tápé grave 512 (Hüttel 1981a, no. 91; Trogmayer 1975, 113, pl. 45, 512). From the period of the wagon burials of the Hart a. d. Alz group only three cremation graves can be listed: Zürich-Burgwies, with sword, belt-hook and bronze bit; Wörschach, a stone cist with bronze cheek-piece, phalerae, pots etc.; Mikušovce tumulus 174, a tumulus with two antler cheek-pieces, pots, dagger and rich bronze goods (Kraft 1927, pl. 13, 4; Hüttel 1981a, nos 132–3.210). These three graves indicate the humble rôle of the horse in the burial customs of the early and older Urnfield period. The question whether the horse-gear represented ridden horses or draught wagon or chariot teams cannot be answered, owing to the incomplete nature of the harness fittings in these three graves.

Although the wagon-graves occupy an extraordinary position in the Urnfield period, their grave structures allow them to be linked to a particular class of contemporary burials. None of the 11 wagon-graves was well preserved, but we are best informed about the examples from Mengen (1955) and Hart a. d. Alz. The grave from Mengen (1955) and, as Müller-Karpe argued, probably also that from Hart a. d. Alz, was housed in a rectangular chamber orientated north-south (Müller-Karpe 1956, 47, fig. 1; 52–3; Schiek 1962, 131, fig. 1). In Hart a. d. Alz the grave was also protected by a stone setting. In both graves the material collected from the pyre (cremated bone, ash, charcoal, burnt pottery and bronze) was deposited in a pile or in an organic container on the floor of the chamber. Both burials can be compared with a series of rectangular north-south orientated graves with wooden or stone chambers or cists, which are distributed in South Germany between the Salzach and the lower Main (Kimmig 1940, 26–8; Müller-Karpe 1948, 12–5; *ibid.* 1956, 52–4; Herrmann 1966, 22–6). Because they contain exceptionally rich goods, they may be regarded as the burials of an elevated social class. Thus the graves from Mengen (1955) and Hart a. d. Alz, judging from their grave form and goods, are likewise only to be understood in the framework of this social group.

The interpretation of the other wagon-graves is much more difficult. The grave from Bruck was completely

destroyed but, according to the state of the bronze finds, was certainly a cremation burial. The grave finds obviously belong to a small cemetery in which four rectangular north-south orientated chamber graves could be excavated, some protected by stone settings (for the cemetery plan see Eckstein 1963, 78, fig. 1). These graves contained finds of the early Urnfield period, including a Riegsee sword, and belong to the above-mentioned series of rich rectangular north-south orientated cist or chamber graves. The original form of the fifth, destroyed grave is sadly unknown, but like Mengen (1955) and Hart a.d. Alz it should probably be assigned to the same grave series.

Little is known of the remaining eight wagon-graves. The cremation grave found in 1838 in a tumulus in the Lorsch Wald obviously belongs to a group of rich tumuli which, among other things, also contained sword-graves (Herrmann 1966, 25–6). The burnt bronze objects from a grave found in 1905 at Mengen could possibly be related to the grave of 1955 found only 400 m away, but whether both graves belonged to the same cemetery, or if they had a similar type of construction, remains unknown. Nothing is known of the forms of the other wagon-graves. Only the associated grave goods occasionally give information about the burial type. The weapons which were certainly (Königsbronn: spearhead), or probably (Hader: spearhead; St. Sulpice: dagger) deposited in the graves deserve special mention.

In summary, as far as the circumstances of discovery allow conclusions, we can say that our wagon-graves belong to a series of early to middle Urnfield period cremations which are particularly characterised by rectangular chamber or cist graves and rich grave goods, especially weaponry.

Judging from the signs of burning on the wagon fittings, the deceased was cremated together with his wagon. In Hader and in the two graves from Mengen the horse-gear was also burnt on the pyre. The personal goods of the deceased could either be burnt (Hart a. d. Alz: sword, knife, arrowhead), or deposited undamaged in the grave (probably in the grave of 1955 from Mengen: dagger and knife).

The grave from the Lorsch Wald seems exceptional – not only because it is the latest member of the Hart a. d. Alz group, dating to Ha A2. It is also unusual in having only a single wagon component, probably from the wagon-box, which was put into the grave undamaged. The wagon therefore does not seem to have been burnt with the corpse on the cremation pyre and the wagon-box fitting could instead be interpreted as a *pars pro toto* deposition – in effect symbolizing the presence of a wagon in the grave. Naturally it is dangerous to draw conclusions from a single find, but the Lorsch Wald grave could indicate a change in burial customs marking the end of the characteristic funerary rites of the earlier wagon-graves of the Hart a. d. Alz group.

The next grave to be discussed occupies an even more exceptional position in the Urnfield period. Grave 3 from Žatec (okr. Louny) in Bohemia contained no wagon fittings, but instead a pair of horse skeletons, six bronze rein-knobs and some pottery sherds (Fig. 119; Preidel and Wurdinger 1928, 107–9). The grave seems to have belonged to a small cemetery; three other graves have been excavated and date to the older Urnfield period (Žatec phase: Jockenhövel 1971, 152–5). Although the rein-knobs from grave 3 are alone rather difficult to date, the excavators noted that the sherds from the grave were similar to those from grave 2. Furthermore, grave 3 had the same rectangular shape and north-east/south-west orientation as the other graves and was positioned close to graves 2 and 4 (3.5 m from grave 2 and 6 m from grave 4). Grave 3 must be given the same date as graves 1, 2 and 4 and therefore belongs in the same chronological horizon as the Hart a. d. Alz group of wagon burials. The fact that only four graves have been excavated in the Žatec cemetery makes the interpretation of grave 3 difficult. But the skeletons presumably represent paired draught horses from a wheeled vehicle, and one suspects that grave 3 was associated with a rich burial in a grave close by. It is curious that there was a step 900 mm from the south-west end of the grave, and the floor of the grave here was 100 mm deeper (Fig. 119). Perhaps the deeper part of the grave marked the space for a wheeled vehicle (presum-

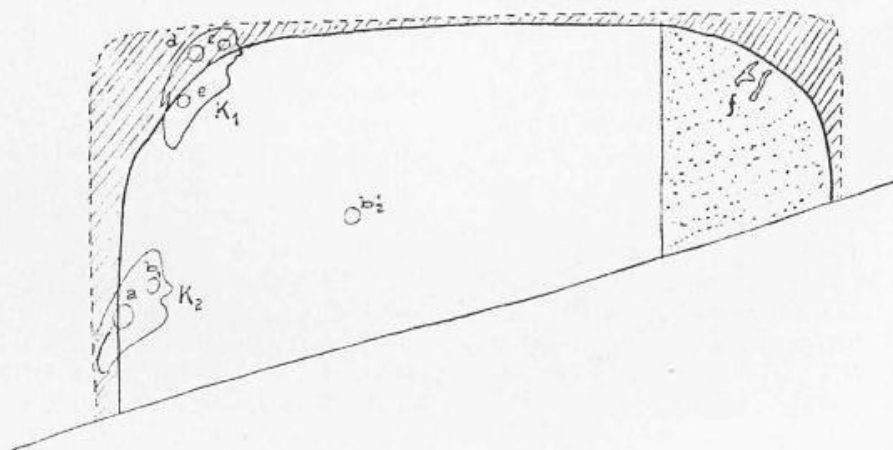


Fig. 119 The horse-grave from Žatec, Bohemia (after Preidel and Wurdinger 1928).

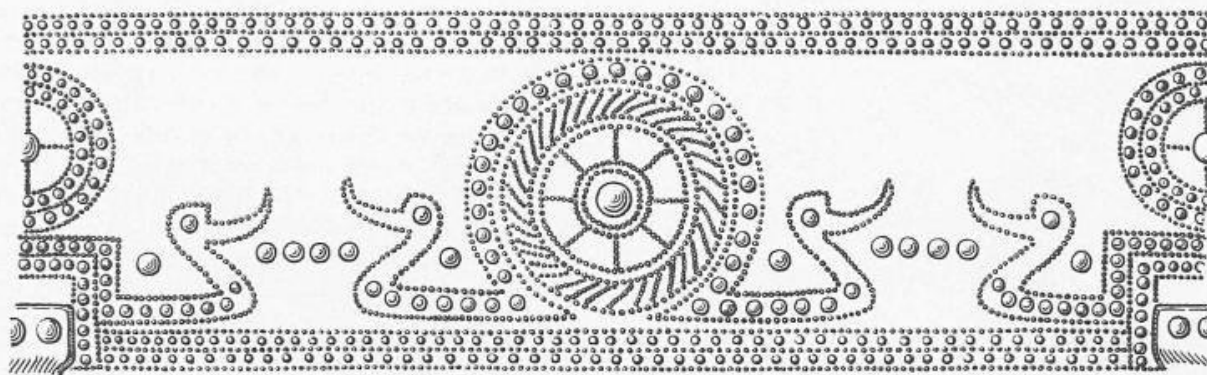


Fig. 120 Lavindsgaard, Fyn: point-boss decoration on a bronze amphora (after Kossack 1954b).

ably a chariot owing to the limited size), but no traces of it survived and this remains an open question.

It seems most likely that Žatec was related in some way to the wagon-graves of the Hart a. d. Alz group. This is supported by its date and by the character of the cemetery. Grave 1, for example was very rich, with numerous pottery vessels, a bronze razor, a bronze knife, a bronze cup of Osternienburg-Dresden type and a rare wooden bucket with ribbed and bossed bronze sheet decoration (Preidel and Wurdinger 1928, 105, fig. 2; 106, fig. 3; Kytlicová 1959, 126–9, figs 6–9). The other graves also seem to have been rich, judging from their large rectangular form: grave 2 must have been disturbed but still contained sherds from at least 20 pottery vessels and grave 4 had 16 pottery vessels, a bronze arm-ring and a bronze pin. It does not seem unlikely that the Žatec horse-grave and the wagon-graves of the Hart a. d. Alz group can all be understood as evidence for the rôle of wheeled vehicles in the burial rites of a wealthy social class. As we have seen, this use of wheeled vehicles in funerary rites was restricted to a relatively short chronological span, hardly surviving beyond the older Urnfield period, and is not represented in the archaeological record for the next three centuries, until the start of the Hallstatt period.^{1a}

Vessel-carrying wagon models (*Kesselwagen*) began to be provided as grave goods at the same time as the wagons of the Hart a. d. Alz group – examples are known from graves at Acholshausen (Bavaria), Milaveč (Bohemia), Peckatel (Mecklenburg) and Skallerup (Denmark).^{1b} Like the wagon-graves, *Kesselwagen* burials are characterised by rich goods, always including weapons, and an elaborate grave construction. While in the graves of the Hart a. d. Alz group the wagon, presumably bearing the corpse, was burnt on the funeral pyre, the *Kesselwagen* were used to carry the cremated remains of the corpse – certainly in the case of Skallerup and, later in the Urnfield period, in the grave from Kánya (Csalog 1943). Both the *Kesselwagen* and the full-size wagons therefore had an important, possibly related function in funeral ideology. Can we conclude that the contemporary appearance of

wagon-graves and graves with *Kesselwagen* was caused by the arrival of new religious beliefs involving wheeled conveyances in ritual?

To answer this question it is crucial to recognise that the *Kesselwagen* and the wagons of the Hart a. d. Alz group belong to a complex of symbols, including particularly waterbird protomes, wheel symbols and lancet, hourglass and double-axe motifs (e.g. Figs 24; 120), which was described by G. Kossack, and which formed at the start of the Urnfield period (Kossack 1954b). The symbolic content of the Hart a. d. Alz wagon group and the *Kesselwagen*, including the wheel, waterbird and vessel, therefore belongs to a widespread and long-lived symbolic complex, which to a considerable extent lent to the Urnfield culture its distinct character. The vessel and waterbird symbols are combined, for example, on a group of pyxides with protomes from Macedonia (Fig. 124, 2–4). A related *Kesselwagen* from Delphi (Fig. 124, 1) represents a fusion of the same symbols, but now with the addition of the wheel. The symbolic combination ‘waterbird + wheel’ is often seen on depictions of the so-called ‘*Vogel-Sonnen-Barke*’ (Fig. 120).

The two little cult wagons from Dupljaja, and particularly the complete example in the National Museum in Belgrade, are doubtless of fundamental importance for a judgement of this world of symbols (Fig. 121; Kossack 1954b, pls 1; 3, 1; Bošković 1959). The complete wagon is made of pottery and is provided with three wheels: two wheels bear the hemispherical ‘wagon-box’, and one wheel is positioned between the two waterbirds which form the ‘wagon team’. The base of the ‘wagon-box’ is decorated with an engraved four-spoked wheel, and a further waterbird sits on the front of the ‘box’. The wagon itself contains a male pottery idol which is covered with rich engraving, presumably representing an elaborate costume. Four holes were drilled into the back of the idol, which apparently originally served to hold the supports of a parasol-like object (Fig. 121).

An interpretation of this wagon model is beset with problems because of its obscure chronological position.

^{1a} An exceptional grave has recently been excavated by Dr E. Jerem at Sopron-Krautacker: grave 79, dating to the transition from Ha A2 to Ha B1, contained harness for a pair of horses, along with other relatively rich grave furnishings. The author is grateful to Dr Jerem for information about this find.

^{1b} Acholshausen: Pescheck 1972; Skallerup: Aner and Kersten 1976, no. 1269; Milaveč: Richlý 1894, 190; Kytlicová et al. 1964, 174; 144, fig. 1, 1–4; Peckatel: Beltz 1910, 203; Schubart 1972, 134.



Fig. 121 Dupljaja, Banat: pottery wheeled model with an idol and parasol (after Bošković 1959). – Scale 1:2.

One could suggest an Urnfield date, judging from the idol's elaborate costume (e.g. the large triangular pendant on its back), particularly in view of the similarity of the Kličevac idol, and parallels for the pendant in the hoard from Gaj (Schumacher-Matthäus 1985, 24). On the other hand one could cite much earlier parallels for the costume represented on the idol, for example the comb-pendant, anchor-shaped bronze sheet pendants and looped neck-rings from the hoards of Tolnanémedi, Pusztasárkánytő and Nagyhangos (Schumacher-Matthäus 1985, 16). A pre-Urnfield dating of Dupljaja is also supported by B. Hänsel's dating of the related idols from Cırna to his Middle Danubian I (Schumacher-Matthäus 1985, 8). On the other hand, parallels for the model's wheels from Friedenfelde-Neudorf, Kreis Templin and Schöneberg, Kreis Angermünde, would suggest a later date, already in the Urnfield period (Sprockhoff 1954, 68, pl. 8, 4; Geisler 1964). In summary we can conclude that the wagon model is impossible to date precisely by its Central European parallels.

Although the wagon model, with its waterbirds and engraved wheel, contains characteristic elements of Urnfield symbolism, its idol and two-wheeled conveyance make it untypical in this period. The cult wagons known from the Urnfield period are provided with four wheels. Anthropomorphic idols are rare in the Urnfield period and merely seem to represent the remnants of a strong Bronze Age tradition.

In my opinion, the special character of the Dupljaja model can perhaps be explained by a relationship with the Aegean world. Thus the shape of the idol is comparable with the 'Phi'-type of Mycenaean idols; the parasol, too, is often documented in the Mycenaean culture, and even more frequently in the Near East. The 'Phi' idols, typical for LH IIIA, have bird-like heads,

folded arms and conical or trumpet-shaped bases, which are also encountered on the Dupljaja idol (Fig. 122; French 1971, pls 14–6). The parasol which, according to H.-G. Buchholz, was a symbol of sovereignty both in the Aegean and the Near East, is often held by chariot-drivers in Mycenaean depictions (Buchholz 1987, 521; e.g. Prosymna: Buchholz and Karageorghis 1971, no. 1248c). In Central Europe, by contrast, Dupljaja remains the only evidence for the parasol, and must have been derived from foreign influences. A pre-Urnfield date, suggested by links with the Mycenaean 'Phi' idols of LH IIIA, would

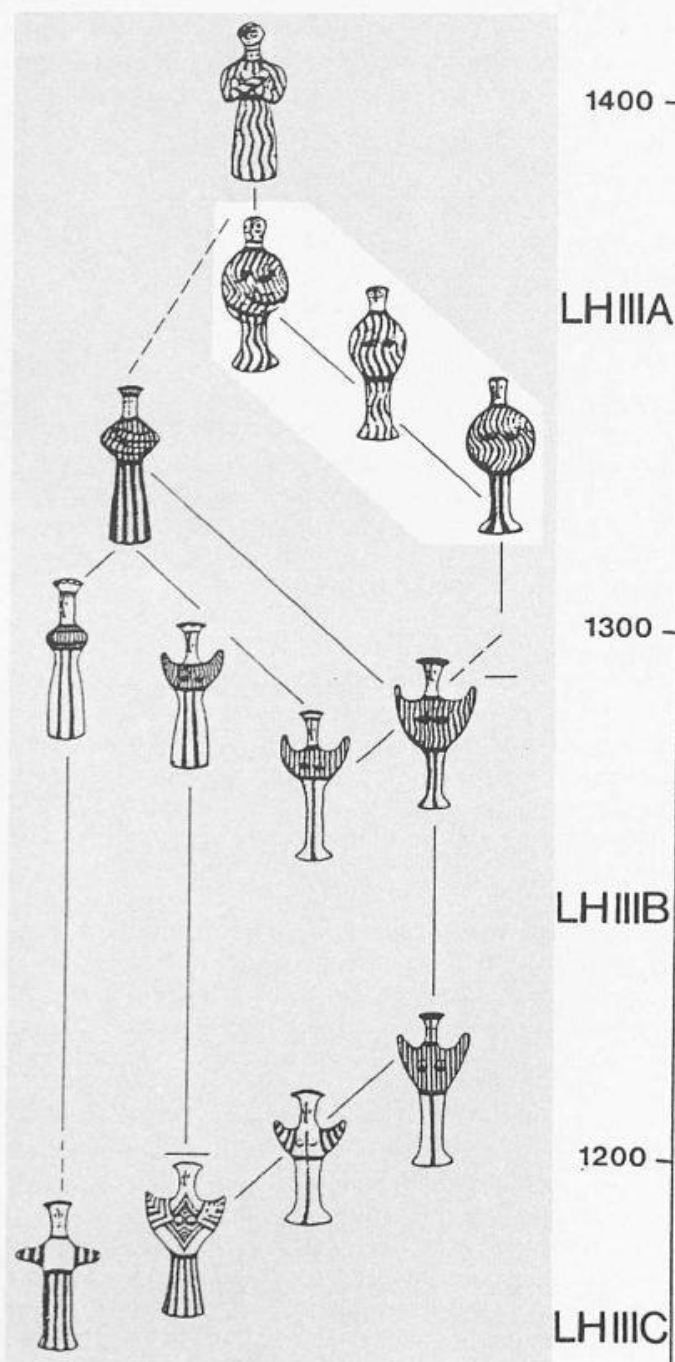


Fig. 122 Typological classification of the Mycenaean idols according to E. French – the idols of the Phi type are emphasised (after Buchholz 1987).

lend the Dupljaja model a key rôle in the formation of the Urnfield symbolic complex. The model, with its combination of waterbird and wheel symbolism, would be quite isolated in the Middle Bronze Age Carpathian Basin, and could hint at the beginnings of new religious ideas. The fact that this document of new religious ideas also betrays Mycenaean influence could even indicate an Aegean rôle in the formation of Urnfield symbolism. Naturally, this remains mere hypothesis in view of the obscure dating of the Dupljaja model. Nevertheless our hypothesis of Mycenaean influence should not be dismissed considering, for example, the Mycenaean sherd of LH IIIA2 from the settlement on the Debelo Brdo near Sarajevo, Bosnia (Sakellarakis and Marić 1975), and the East Mediterranean predecessors for the Urnfield waterbird symbolism which in the last few years have been noticed with increasing frequency (Müller-Karpe 1980; Matthäus 1980; *ibid.* 1981; Schauer 1985, 183; 184, fig. 62).

Our treatment of the Early Urnfield wagon finds has shown that they cannot be understood in isolation. Their relationship to a large number of contemporary wheel depictions and wheeled models (often associated with other symbols, especially the 'vessel' and 'waterbird') is best explained by postulating an underlying symbolic or cult meaning for the wagons. This 'religious' hypothesis suggests one reason for the wide dissemination of the ceremonial wagon in the Urnfield period, and its important rôle in society.

Turning to the Early Iron Age we again find a range of wagon models which allow insights into the use of the four-wheeled ceremonial wagon. The Macedonian and Thessalian pyxides and the '*Kesselwagen*' from Delphi illustrate the use of the symbolic combination 'wheel + vessel + waterbird' in the 8th and 7th centuries BC (Fig. 124). And the '*Kesselwagen*' from Kánya, Kom. Tolna, which probably dates to the younger Urnfield period, provides a link between the earlier '*Kesselwagen*' and the examples of the Villanovan and Hallstatt cultures (Csalog 1943). The Early Iron Age models comprise vessel-bearing wagons which can be divided into four distinct groups (Fig. 123). The Italian examples, which make up the majority of the models, have been published in full by E. Woytowitsch, who also discussed them in detail, and further information on all the Italian models discussed below can be obtained from his work (*ibid.* 1978, 54–80; the *Beckenwagen* from Veii, Grotta Gramiccia grave 871 is illustrated by Müller-Karpe 1974, pls 22, 1; 23, 1; the recently excavated *Beckenwagen* from Marsiliana d'Albegna will be published in an article by the author and M. Egg).

1) The so-called '*Beckenwagen*' from Praeneste, Veii, Cerveteri, Marsiliana d'Albegna and Vetulonia form a well-known group of wagon models dated to the 7th

century BC. Three further fragments of a '*Beckenwagen*', now in the Ashmolean museum, Oxford, supposedly came from Lezoux in France but it must be said that nothing is known of its discovery and it is impossible to check the provenance (Freidin 1980). A second French piece, apparently from the vicinity of Nérès-les-Bains, probably likewise came from a '*Beckenwagen*'² (Boucher 1976, 14, pl. 1, 2).

2) The second group of models comprises the wagons bearing zoomorphic or ornithomorphic vessels. Nine examples are known from Italy (the pieces with provenances come from Bisenzio, Tarquinia, Este, Viterbo, Salerno and Canosa di Puglia) and a further piece was discovered in a tumulus on the Glasinac plateau in Bosnia (Seewald 1939). When the circumstances of discovery are known, these models were always found in graves, associated with grave goods of the 9th to 7th centuries BC. Most of the vessels are ornithomorphic and can often be recognised as waterbirds; sometimes they are also provided with horns ('*Vogelrind*').

3) The third group includes the so-called '*Kesselwagen*' – wagons bearing a bronze vessel. The vessels are mostly raised above the wagon, often supported by twisted bronze rods, and the wagons themselves sometimes carry small bronze figures. The examples from Stettweg (Egg, Forthcoming 2), Sesto-Calende, Como-Ca' Morta, Bisenzio and Lucera are well-known. This group betrays clear orientalizing influence, for example the fluted bronze bowl of the Ca' Morta '*Kesselwagen*' and the form of the example from Bisenzio, which presumably imitates the Cypriote series of cauldron stands. The remains of models from Bologna, Podere Malatesta, Radkersburg, Kirchberg a. d. Raab and perhaps even the lead model from Frög could also belong to the '*Kesselwagen*' group,³ but because these are all either lost or fragmentary, it is impossible to be certain about their original form.

4) The last group of wagon models is formed by the '*Kesselwagen*' with ornithomorphic protomes from Orăștie (Fig. 125; formerly Szászvárosszék/Brooser Stuhl; Horedt 1964, 124, no. 12; 121, fig. 1, 12), Bujoru (Fig. 126; Beda 1976; Moscalu and Beda 1988) and Delphi (Fig. 124, 1; Kilian-Dirlmeier 1974). These wagons are characterised by a bronze vessel with large antithetic bird protomes; the group is closely related to the pyxis pendants from Macedonia and Thessaly (Figs 123; 124, 2–4; Kilian-Dirlmeier 1979, pls 83–9).

The models of the last group are of great interest for our study, especially because they furnish evidence for a continued use of wagons in cult in the Hallstatt period, and furthermore for the long survival in cult of the symbolic combination 'wagon + vessel + bird'. The customs of the Thessalian city of Crannon, recorded by

² L. Nebelsick, Berlin, has recently informed me that '*Beckenwagen*' fragments are also to be found in the Museum für Vor- und Frühgeschichte, West Berlin. Nebelsick suspects that the 'French' fragments mentioned in the text, along with the Berlin pieces, all came from a single French(?) hoard which was divided up and given false provenances by dealers in the Antiquity trade (these pieces are not included on the distribution map, Fig. 123).

³ Podere Malatesta: Zuffa 1950, pls 1, b; 5, 34–58; Radkersburg: Egg 1986a; Kirchberg a. d. Raab: Aigner Foresti 1980, 106–7, note 87; Frög: Egg 1987b. A further wagon model was found in Bologna, Melanzani grave 64 (unpublished).



Fig. 123 Map showing the distribution of wagon models and pyxis pendants, and the location of Crannon.

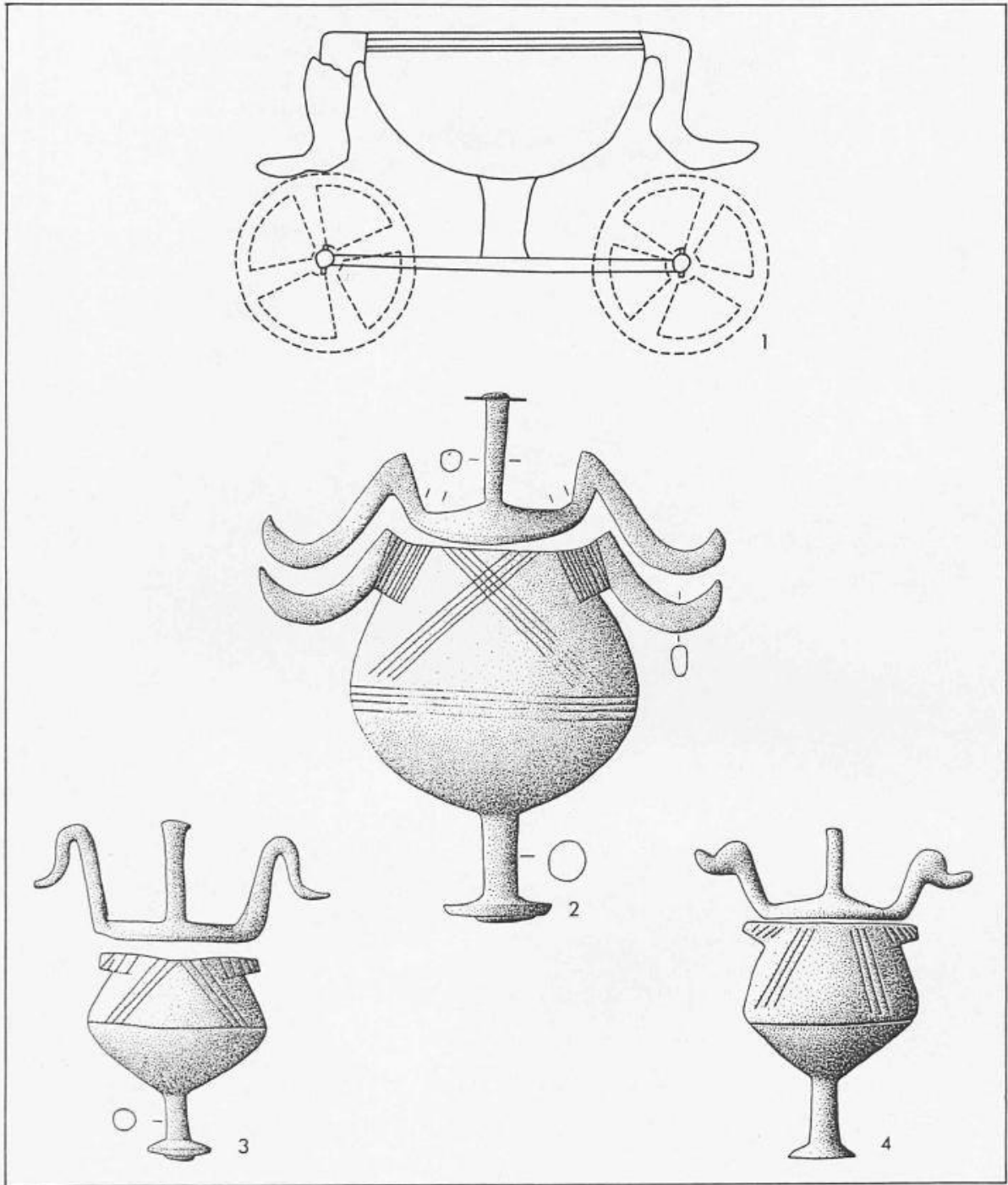


Fig. 124 1 Delphi, sanctuary of Apollo, reconstruction of a wagon model; 2-3 Chauchitsa, graves 4 and 8, pyxis pendants; 4 Pontoheracleia, Macedonia, grave find, pyxis pendant (after Kilian-Dirlmeier 1974 and 1979). - Bronze. - Scale 2:3.

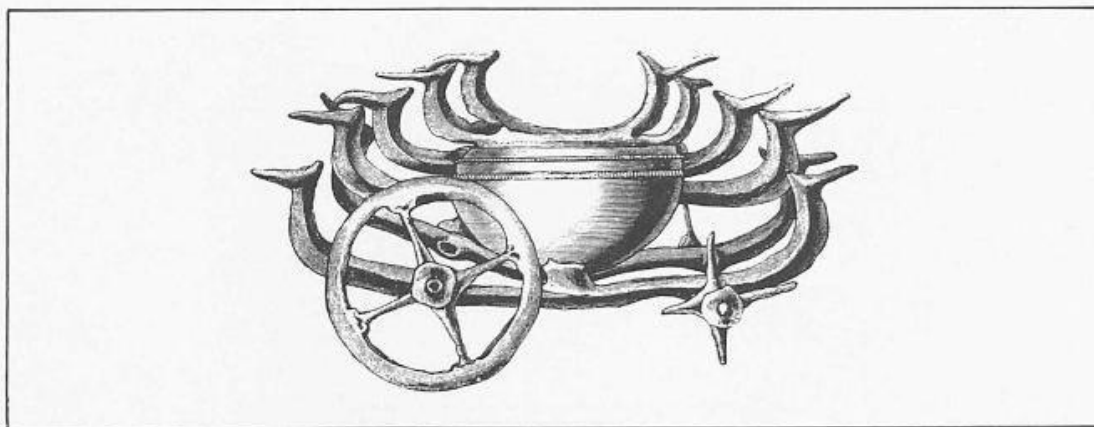


Fig. 125 Bronze wagon model from Orăștie, Transylvania (after Hampel 1887). – Scale 1:3.

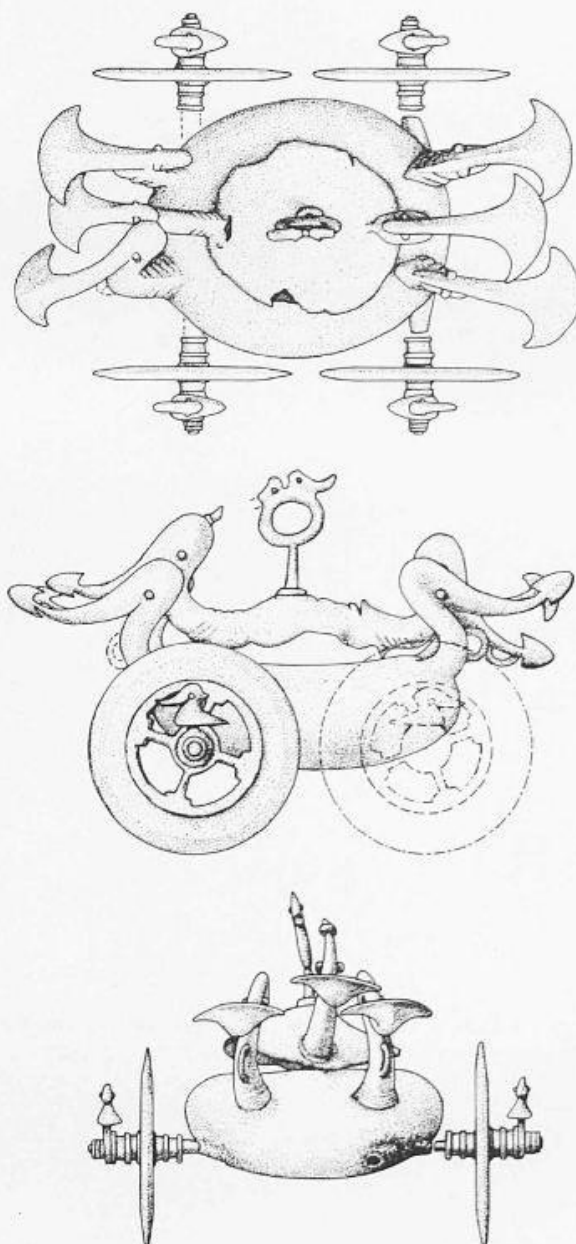


Fig. 126 Bujoru, jud. Teleorman, Romania: 'Kesselwagen' decorated with water-bird protomes (after Moscalu and Beda 1988). Length 26 cm.

Antigonos of Carystos in the 3rd century BC, are obviously of prime importance for our understanding of the wagon's symbolic and cultic meaning (see particularly Simon 1972). In chapter 15 of his *'Historiarum Mirabilium'* Antigonos described a sacred bronze wagon which, in times of drought, was set in motion by the inhabitants of the city and, accompanied by prayers, was supposed to produce rain. The cult practices were associated with two sacred ravens:

They say that in Crannon in Thessaly there are only two ravens. This is why two ravens on a bronze wagon (two, because more than two are never seen) are represented on written treaties of friendship as the distinguishing emblem of the city, which it is usual to add in all cases. The wagon was attached for the following reason (for this might seem a strange thing to do): they have a bronze wagon set up as a votive offering which, in times of drought, they shake, praying to the god for water; and this, they say, is then granted. Theopompos reported something even more remarkable. the ravens, according to him, stay in Crannon only until they hatch their young; when they have done this, they leave their young behind and depart. Ktesias tells of something similar in Ecbatana and in Persia. But since he lies so often, I omit that passage as belonging to the realm of romance. Myrsilos of Lesbos reports that in the Lepetymnos mountains in Lesbos there is a temple of Apollo and a heroon of Lepetymnos, where (as in Crannon) there are only two ravens, although there are many ravens in the places round about. (Antigonos of Carystos, *Hist. Mirabil.* 15)⁴

The wagon described by Antigonos, together with the ravens, also formed the emblem (*parásemon*) of Crannon and can be seen on coins of the city of the 4th century BC (Fig. 127). The combination of wagon, vessel and bird-pair duplicates the symbolic content of the cult wagon models from Delphi, Orăștie and Bujoru, but also certainly betrays a relationship to the Macedonian-Thessalian pyxis pendants (Fig. 124). Clearly the cult meaning of the 'vessel-bearing wagon' and the 'vessel with antithetic bird-pair' survived at least until the 3rd century BC in the Balkans. This cult tradition can probably be detected in other Greek religious ideas, for example in a myth told by Alcaeus about Apollo in his swan-drawn chariot returning from the land of the Hyperboreans to Delphi – where his advent caused the end of a drought (i.e. he caused rain):

When Apollo was born, Zeus equipped him with a golden mitra and a lyre, and also gave him a team to drive. The team was of swans. Zeus sent him to Delphi, to the Castalian spring, there to speak to the Greeks justice and divine law. But Apollo mounted his chariot and let the swans fly to the Hyperboreans. When the people of Delphi learnt of this, they composed a paean and set it to music and assembled choirs of boys around the tripod and called on Apollo to come back from the Hyperboreans. But he stayed the whole year with the Hyperboreans and delivered oracles among them. When he thought it was time for the tripods in Delphi to resound, he gave another order to the swans, to fly away from the Hyperboreans.



Fig. 127 Bronze coins from the city of Crannon, Thessaly, from the 4th century BC (after Cook 1925).

It was summer, and exactly the middle of summer, when Alcaeus [in his poem] brings Apollo back from the Hyperboreans. And so it was in the brightness of summer and with Apollo living among the people of Delphi, that the god was surrounded by the summery song of the lyre. The nightingales sing in his honour (as birds are accustomed to do in Alcaeus), the swallows too and cicadas sing, not to tell of their own fortunes among men, but singing all their songs in honour of Apollo. The Castalian spring, according to the poem, flows in silvery fountains and the river Kephissos rises high, rolling with dark waves, like the Ephineus in Homer (because Alcaeus, like Homer, is compelled to make even water have the power to sense the presence of the god). (Himerios, *Orationes* 14, 10)⁵

I do not consider it exaggerated to postulate an unbroken line of continuity between the Dupljaja model (Fig. 121) and the cult wagons of 4th century Crannon (Fig. 127). The tradition consisted in the use of cult objects combining the wheel, the vessel and a pair of birds. In my opinion the Delphi (Fig. 124, 1) and Crannon cult equipment represent a local expression of a widespread and long-lived religious tradition which is attested in many parts of Europe by the well-known and well-defined range of Urnfield symbolism (Kossack 1954b). Although I do not feel able to make a definite judgement, it seems a distinct possibility that parts of this religious tradition were incorporated into the Apollo cult,⁶ if it is accepted that:

- 1) Elements of Apollo's paraphernalia (vehicle drawn by waterbirds) were derived from Urnfield symbolism.
- 2) Apollo's rain-making aspect is linked by certain attributes (vehicle, pairs of birds) to the rain-making cult at Crannon.
- 3) The God's seasonal sojourn among the Hyperboreans indicates for part of the Apollo cult a relationship with the north.

The cult use of the 'vessel-wagon' in the Balkans discourages a purely secular interpretation for '*Kesselwagen*', for example as 'wheeled decanters', or for the Urnfield and Hallstatt wagons simply as prestigious

⁴ Keller 1877, 4–5. The author would like to thank D. Britton and P. Glare (Oxford) for their translation of this passage.

⁵ Treu 1952, 23–5. The author would like to thank D. Britton and P. Glare (Oxford) for their translation of this passage.

⁶ For discussions of this question, and possible links with the cult of Zeus, see Moustaka 1983, 19–20, and especially Simon 1972.

conveyances or 'coaches'. Therefore it seems likely that the early Urnfield wagons and '*Kesselwagen*' represent the earliest stage of a cult tradition (recognisable by its symbolism) which then lived on through the later Urnfield period and into the Iron Age.

12.2 THE ROLE OF WAGONS AND HORSE-GEAR IN THE LATER URNFIELD PERIOD (Ha B)

The Hart a. d. Alz group of wagon-graves, dated to the 13th and 12th centuries BC, has much in common with the wagon burial rite evidenced more than 300 years later in the Hallstatt period. But the absence of wagon burials in the intervening period rules out continuity in funerary practices, and we must seek other possibilities to explain how the tradition of the four-wheeled ceremonial wagon remained alive during the later Urnfield period.

Much of our archaeological evidence for the wagons of the later Urnfield period comes from hoards. The interpretation of hoard deposition is a difficult task and for significant results detailed, often statistical studies are generally required. The following pages only offer a discussion of particular hoards with wagons and horse-gear and it has been necessary to concentrate on an area of Northern Europe where research is relatively advanced. The works of E. Sprockhoff, W.A. von Brunn and H.-J. Hundt on the hoards of the southern part of the Nordic zone are specially important.

Von Brunn, in a study of the hoards of Period V between the Elbe and Vistula, put forward a sacral interpretation for the majority of the depositions, suggesting that the different compositions of the hoards could reflect different cults (von Brunn 1980). He particularly drew attention to the frequent association of 1) horse-gear and female attributes (e.g. hanging bowls, ornaments) and 2) bronze-working remains (scrap and casting debris) and tools (especially socketed axes and sickles). Von

Brunn published a sketch of the kind of cult activities he imagined could be represented by the former type of hoard composition (Fig. 128). The frequent association of horse-gear and female attributes in hoards of the Nordic zone has also been noticed by other authors.⁷

It is not necessary here to make a detailed analysis of von Brunn's results. Instead we shall attempt to reach general conclusions about the character of the hoards concerned. Although the trend of recent research has tended to favour sacral instead of profane interpretations of hoard deposition, we should avoid broad generalisations. Instead it is necessary to appreciate the multitude of different reasons to deposit objects in the ground (see the recent discussions in Geißlinger 1984; Mozsolics 1987; Pauli 1985; Torbrügge 1985). With these methodological caveats in mind, we are nevertheless attracted to von Brunn's interpretation for a number of hoards.

In the case of Karbow, Pyritz, Rekau and Ückeritz, it is the composition of the hoards which suggests a special interpretation. In Ückeritz, the hoard contained 110 bronze horse trappings, four fragmentary antler cheek-pieces, a few scraps of leather and wood, two pebbles and two damaged bronze pins. Much of the horse-gear seems to have come from a pair of draught horses, including four cheek-pieces (Lampe 1982, pl. 29, t-w), two attachments from a yoke (ibid. pl. 30, aa-bb) and a pair of large phalerae (ibid. pls 18c; 19c; see also p. 44). The Karbow hoard included two horse bits, four cheek-pieces, 14 phalerae and a mould for a socketed axe; von Brunn argued convincingly that the phalerae represented two sets of seven pieces, for two horses. The Rekau hoard comprised three cheek-pieces, two phalerae, three jangling pendants and fragments of two bronze sheet cups; the horse-gear probably represents the incomplete harness of a pair of horses. The find from Pyritz contained four cheek-pieces, three jangling pendants, seven phalerae, 71 rein-knobs and a number of bronzes which can probably all be regarded as female attributes (seven neck-rings, 12 pendants, numerous thin spiral tubes etc). It is hard to

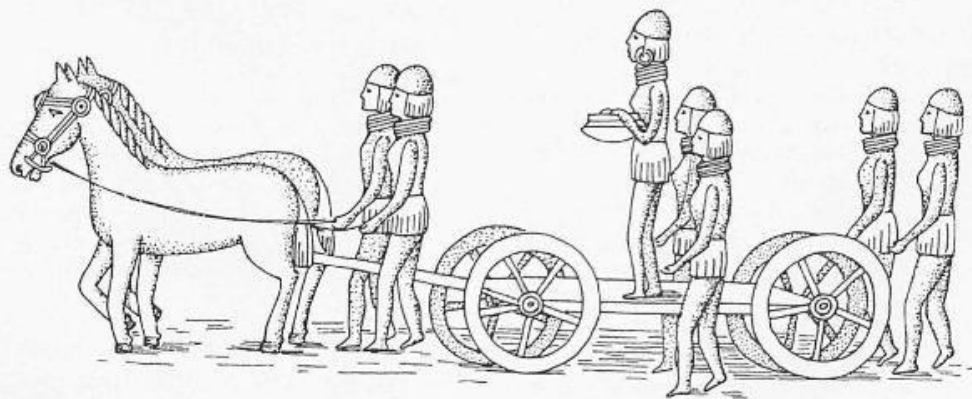


Fig. 128 Cult activities suggested by the hoard from Morgenitz (after von Brunn 1980).

⁷ Thrane 1975, 257; Larsson 1974, 227. See for example Saesing: harness for paired horses together with female attributes – here also with a fragmentary sickle, a number of small objects of uncertain use, some pieces of leather and hazel-nut shells. Thrane 1967, DK 10.

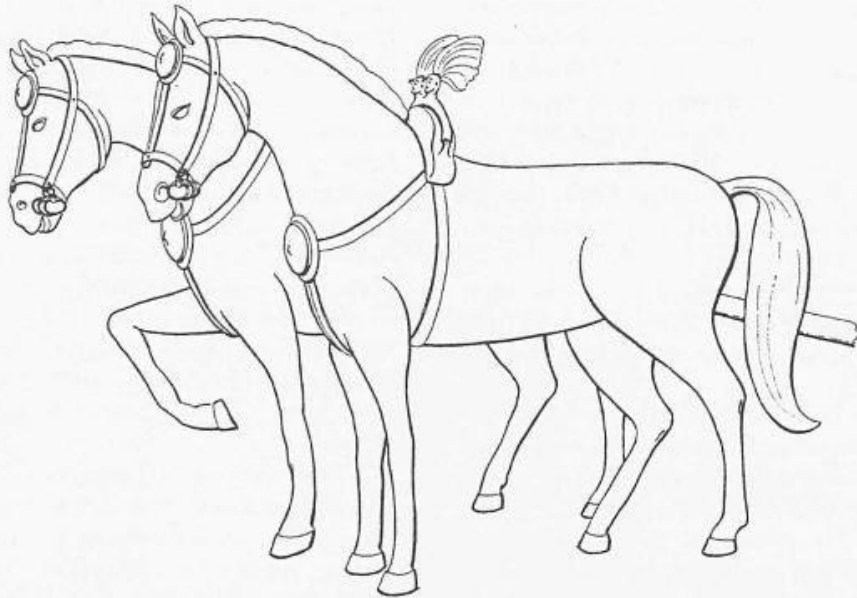


Fig. 129 Reconstruction of the harness of a pair of horses from the Fogdarp hoard (after Larsson 1974).

avoid the conclusion that the contents of all four hoards show the intentional selection and combination of specific attributes – and all four hoards are suited to von Brunn's method of analysis (*ibid.* 1980). It is difficult to suggest a profane interpretation.

We should also add the disturbed hoard from Fogdarp, Sweden, to this list. The hoard contained, apart from two lur terminals and two or three bracelets, a pair of attachments from a yoke, four phalerae and four rattling pendants (Larsson 1974). Larsson, in his discussion of the hoard, also came to the conclusion that the horse trappings represent the harness of a pair of draught horses, probably from a cult vehicle. His reconstruction of the draught horses is shown on Fig. 129. Another hoard of Period V with horse-gear was found in a bog near Høve, Denmark (Broholm 1946, 213–4). The bronzes include two bits and two phalerae, along with female attributes: a hanging bowl, a spiral arm-band and a belt ornament. Apart from the combination of paired horse harness and female attributes, the find circumstances also point to ritual deposition.

Von Brunn argued that a number of other hoards contained fittings from pairs of draught horses, even though horse bits and cheek-pieces were lacking. His arguments were especially convincing in the case of Kallies (von Brunn 1980, pl. 34), Schwachenwalde (*ibid.* pls 54–5) and Stolzenburg (*ibid.* pl. 60). Each hoard had four jangling ring pendants which originally seem to have been fitted either side of the horses' mouths (judging from the horses on the bronze socketed terminal from Svatarp: Sprockhoff 1956, 260; 239, fig. 56, 9; von Brunn 1980, 117 and note 67) and either six or 12 phalerae suggesting sets

of three or six phalerae for each horse. The hoard from Stolzenburg also had a pair of fittings like those from Ückeritz, which were probably originally attached to a yoke (compare Sprockhoff 1956, pl. 58, 6 with Fig. 100, 9 and the examples illustrated by Kossack 1953). In the case of these hoards, it is not only their composition but also their circumstances of deposition which argue for a special interpretation. The bronzes from Kallies were found alongside a pottery vessel containing bones – suggesting either that the deposition was a female burial or that it included an offering of human or animal bones or meat (Sprockhoff 1956, 4). The Schwachenwalde bronzes were found, contained in a bronze vessel, at the bottom of a pond.⁸ In Stolzenburg, the hoard was discovered in a tumulus, contained in a pottery vessel. Without wishing to put forward an exact interpretation for either hoard, we can reach the conclusion that neither Kallies nor Schwachenwalde are open to a profane explanation; in Schwachenwalde the bronzes were deposited irretrievably and in Kallies the associated vessel and bones suggest a ritual offering.

In my opinion, the observations of von Brunn for Period V hoards are supported by those of Period VI. The hoard from Kielpino (formerly Kölpin), Pomerania, quite obviously contained harness for a pair of horses: two bronze bits, pairs of jangling ring pendants, and sets of rein-knobs; also three large fibulae, a bronze 'diadem', two bronze moulds for socketed axes, an iron knife and a lump of unworked iron (Fig. 130). The hoard was found five feet deep in a peat bog – presumably indicating that it was not meant to be retrieved (Anon. 1885b). The hoard from Eskelhelm also contained harness for a pair of horses:

⁸ The hoards from Alt Ristow and Morgenitz, containing horse fittings which may also indicate pairs of draught horses, were also found in ponds (von Brunn 1980, 115ff.; Sprockhoff 1956, 8; 46). Also note Hundt's comment that the Karbow hoard came from a bog or swamp (Hundt 1955, 100; but according to Sprockhoff, the find was made in a 'wet field': Sprockhoff 1956, 34).

two bits (one of bronze and one of iron), four cheek-pieces, four jangling pendants and twelve bronze phalerae (Fig. 131). The hoard also contained a large disc-shaped pendant along with two fittings for its suspension, a bronze 'hanging bowl' and fragments of at least two further bronze vessels (a ribbed bucket and a handled ?cup). The bronzes were uncovered during digging in a field, and no other finds or constructions were noticed (Montelius 1887). The 'hanging bowl' and pendant from Eskelholm as well as the fibulae from Kielpino seem, in the Nordic zone, to be female attributes, and their combination with horse-gear could again reflect the sort of cult activity which von Brunn suggested (see for example Fig. 128).

Finally we should mention the Woskowice Małe (formerly Lorzendorf) hoards, which were discovered at the edge of a late Hallstatt cemetery (Grempler 1899; Ebert 1926, 312; pl. 207–8). The larger hoard, which probably dates to Ha D1, contained two bronze horse bits, four bronze cheek-pieces, four bronze ring-footed rein-knobs, 39 bronze looped rein-knobs, four looped triangular jangling pendants, three ribbed buckets, three hollow bronze neck-rings and two elaborate bronze chains. Once again the hoard includes harness for a pair of draught horses, together with female attributes (neck-rings). And its location – at the edge of a cemetery – may suggest ritual motives for its deposition.

Sprockhoff recorded that about one third of the Period V hoards in the southern part of the Nordic zone were deposited in wet locations (marshes, bogs, ponds etc.) and in Denmark the proportion is closer to two thirds, leading us to conclude that the people who buried many, or most of them did not mean them to be retrieved (Larsson 1974, 186). This plausible argument encourages a sacral interpretation for the depositions of paired horse harness; presumably the burial of the hoard was an element in some sort of ritual or cult offering. Von Brunn noted that complete offerings seem to have been avoided: instead incomplete elements (for example of a set of ornaments) were deposited, perhaps being symbolic of the whole (von Brunn 1980, 111; von Brunn also noted that the frequent signs of intentional damage are open to the same interpretation).

The motives behind these offerings are, of course, hidden to us. Nevertheless, we should recall H.-J. Hundt's important study of Nordic hoards of Period IV (Hundt 1955). Hundt described the provision of grave goods and the practice of hoard deposition in Periods III, IV and V, and drew attention to significant correlations (ibid. 1955, 109). Thus it is possible in Period III to recognise hoards resembling grave *ensembles*, for example containing complete sets of ornaments. In Period IV, burials are furnished with poorer grave goods while simultaneously hoards become more frequent, still often resembling grave *ensembles*. In Period III, but even more so in IV, Hundt

recorded the practice of providing damaged, incomplete or symbolic grave goods: at the same time the contents of hoards were similarly damaged, sometimes showing signs of burning. In Period IV, Hundt noted the appearance of miniature swords and small fibulae in graves, whereas in contrast the hoards contained full-size swords and large fibulae. Corresponding to this the 'hanging bowls', which were previously found in graves, ceased to be provided as grave furnishings in Period IV and were instead deposited in hoards. These facts and many other considerations led Hundt to suggest that many of the Period IV hoards were in fact 'funerary treasures' (*Totenschätze*), understood as the 'supplementation or substitution of grave furnishings which, with the introduction of the cremation rite, lost their former importance' (Hundt 1955, 107 – quoting Hahne).

While the hoards discussed above have given us grounds to suspect that draught horses and wagons were involved in cult activities in Northern Europe in the Late Bronze Age, it is difficult to come to more precise conclusions. The fact that the hoards lacked wagon fittings seems worthy of comment. Naturally one asks oneself whether the wagons with bronze fittings of the Egemose group played a rôle in these cult activities (see Ch. 3.4). All three of the North European finds of this type came from hoards (Fig. 22). In the case of Rohov, the Period IV hoard comprised a bronze axle-cap, about 40 bronze bracelets and leg-rings and one bronze cup of Fuchsstadt type; precise details of its method of deposition were not recorded. It may be tempting to interpret the Rohov hoard as a reflection of some sort of cult activity involving cult wagons, women and bronze vessels (e.g. Fig. 128), but there is no firm evidence to support this. The Egemose wagon, on the other hand, does seem to represent a cult deposition: the hoard was located at the edge of a bog and the fittings showed signs of intentional destruction and burning.

The cult activities attested by the hoard finds with paired horse-gear or wagon fittings discussed above seem to be reflected with dramatic clarity in another group of finds. The Pomeranian face-urns are distributed within the southern part of the Nordic zone where many of the hoards were found (Fig. 145). About 11 of these cinerary urns bore depictions of horse-drawn wagons, which often seem to have been part of some sort of procession.⁹ It is not possible to interpret the scenes on the face-urns with any precision: in five cases the wagons carried a standing figure, on four vessels mounted horses formed part of the 'procession' and wild animals are shown four or five times, perhaps being hunted. The scenes could portray cult activities similar to those which, according to von Brunn, ended with the deposition of certain bronze hoards (see Fig. 128). Although the face-urns are generally given a date in the later part of the Hallstatt period, we were able to show that cult deposition of hoards with paired horse-

⁹ Apart from the six wagon depictions on Fig. 145, further examples are known from: Olszanowo (formerly Elsenau), pow. Czluchów; Dzieścielec (formerly Zinzelitz), pow. Lębórk; Krosinko (formerly Klein Krössin), pow. Łobez; Wymysłowo, pow. Gostyń; Borucina, gm. Stężyca, pow. Gorzów Wielkopolski; possibly Drożdżenica, pow. Tuchola. See La Baume 1963, pls 4, 166; 5, 177; 12, 479; 27, 1258.1298; Podgórski 1982.

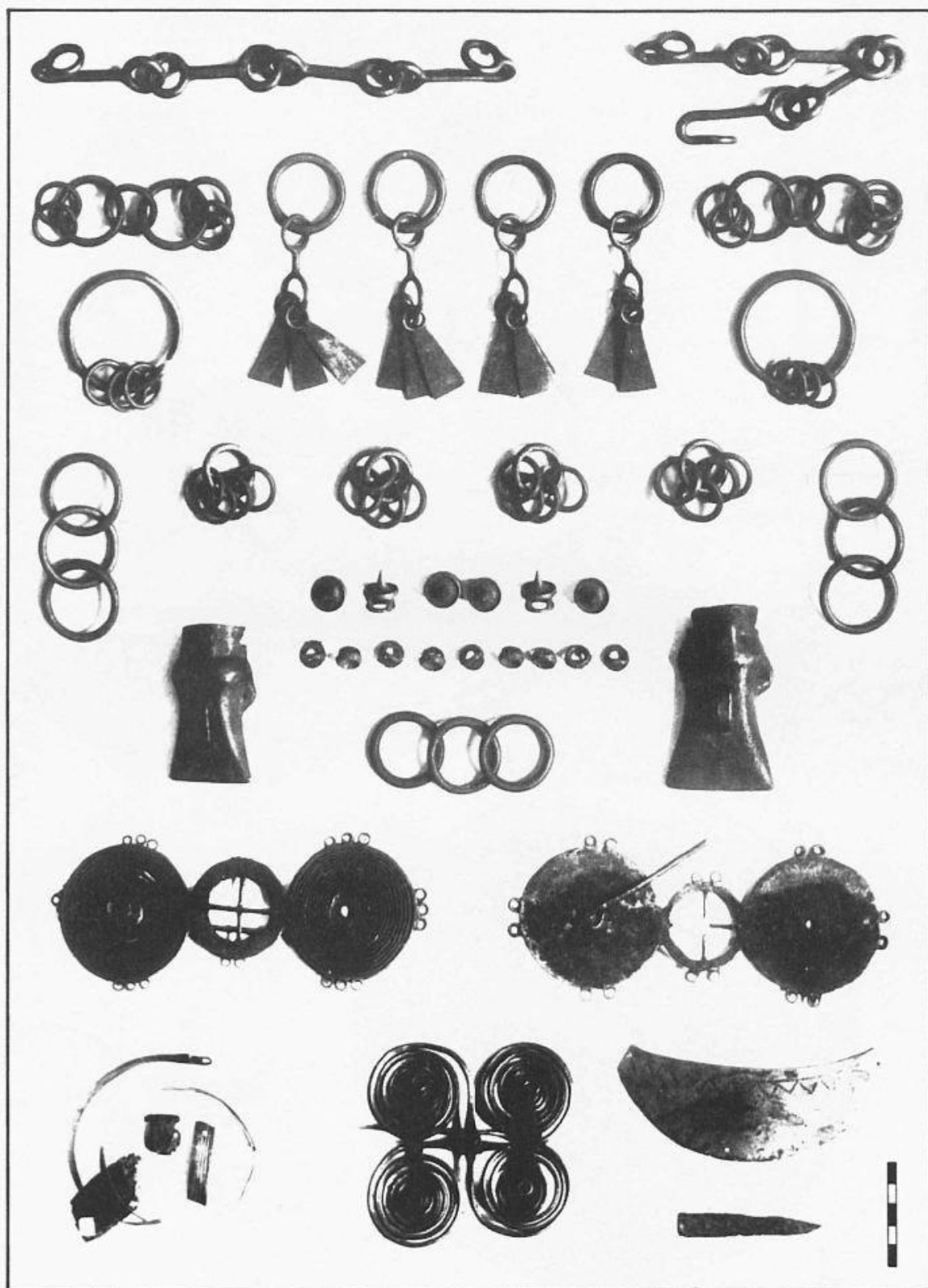


Fig. 130 The hoard from Kietpino, pow. Kołobrzeg, Pomerania (photographic archive of the RGZM, Mainz).

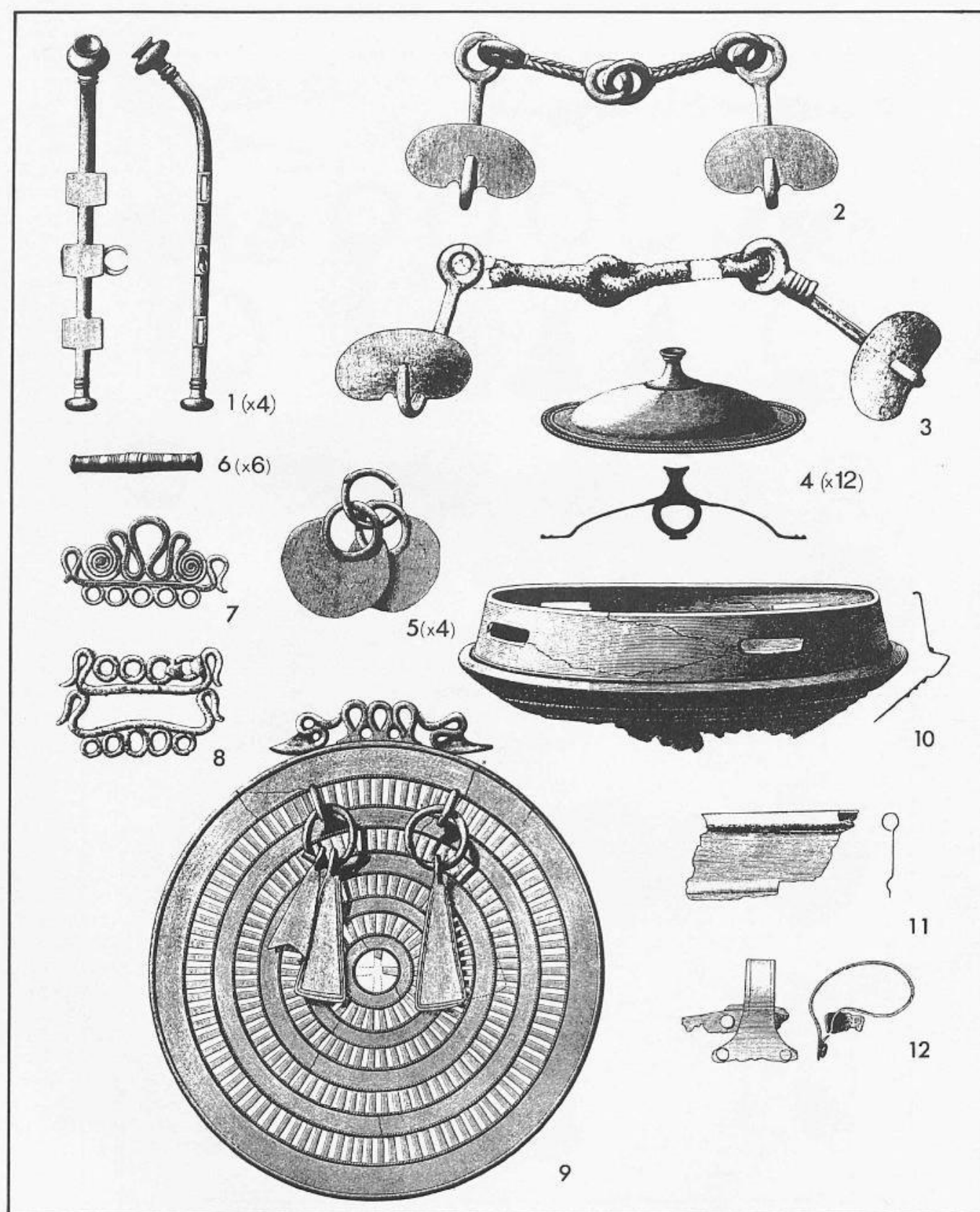


Fig. 131 The hoard from Eskelholm, Denmark (after Montelius 1887; 1913). — 3 bronze and iron, otherwise bronze.

gear and female ornaments continued into Period VI (e.g. Kielpino/Kölpin, Eskelhelm, possibly Woskowitz Male/Lorzendorf), so hoards and face-urns could represent a continuous tradition. Perhaps the small group of so-called '*Deichselwagen*', distributed on the middle Oder, played a part in this tradition; alternatively they could form part of the paraphernalia of a different or related cult.¹⁰ The *Deichselwagen* are generally dated to Period V by the pair of arm-bands associated with the examples from Pierstnica (formerly Groß Perschnitz; see Sprockhoff 1956, 180; pl. 38, 7). The find circumstances of these small cult objects provide little information about their function; the arm-bands from Pierstnica, however, could suggest that they were manipulated by women.

Turning our attention to other parts of Europe, we find less information available about the use of wagons. But the newly discovered hoards from the Bullenheimer Berg are of considerable interest (Diemer 1985). The cult nature of some of these hoards is attested among other things by the following considerations: 1) apart from bronzes, hoard 11 contained animal bones and a boar's tusk and the associated post-hole indicates that the position of the hoard was marked, 2) hoards 1-4 were close together and show the repeated deposition of small collections of objects at the same place. Hoard 4 is most important for us, containing four bronze axle-caps (see Ch. 3.7). Hoard 11 is also of interest because it contained both female and horse attributes, possibly offering a parallel for the hoards of similar composition in the Nordic zone. Apart from 30 decorated bronze phalerae (possibly ornaments for a pair of horses), the hoard contained 29 ankle-rings, two bronze buttons and two pendants made from concentric rings. Similar ring-pendants are known later, in the Hallstatt period, as typical female ornaments (Egg Forthcoming 1); it is not unlikely that these pendants are related to the larger jangling pendants from western and northern Europe (so-called '*tintinnabula*'; note also the comparable pendant from Eskelhelm), and they could have signified women with a special rank or cult rôle.

The rich finds in the Heathery Burn Cave can also doubtless be interpreted as cult depositions. The cave measured about 500 ft. in length and contained more than 20 groups of finds, among which were animal and human bones and traces of fires. The eight nave-rings were associated with six bronze phalerae and a bronze sword of Ewart Park type, at the very end of the cave (see Britton and Longworth 1968, 10: position A on plan).

The cast bronze wheels of the Coulon group were also often deposited in a special way. In the case of Fa, Coulon, Haßloch and Stade they were apparently buried alone: in Coulon one wheel 1 m deep in a peat bog; in Fa two wheels, probably without associated finds; in Haßloch 103 fragments of two intentionally smashed wheels, again 1 m

deep; in Stade four wheels buried 400-600 mm deep in sand. Curiously, the pairs of 'Early Bronze Wheels' from Obišovce and Arcalie were deposited alone as hoards in a similar way. It is difficult to believe that they were buried for profane reasons, either by a bronzesmith or trader, or hidden at a time of danger. Instead it seems more likely that the depositions had some cult purpose, perhaps the disposal of a vehicle used in cult activities or deposition as cult offerings.

The wagon fittings of the Bad Homburg group are chiefly known from hoards. Late Urnfield hoards also occasionally included fragments of cast bronze wheels of the Coulon group (Triou, Amboise). It is quite possible that these fragments entered the hoards by chance, as scrap, as in the case of most of the earlier wagon finds in the hoards of Br D and Ha A. Alternatively, a comparison of the finds from Bad Homburg (Figs 37-8), Weinheim-Nächstenbach (Fig. 40), Neuvey-sur-Barangeon (Fig. 41), Choussy (Fig. 42) and Vénat (Fig. 43) could raise the suspicion that the hoards contained conscious selections of wagon components: a nave fragment, a few phalerae, some decorative box fittings and some spoke fittings - perhaps symbolizing the whole wagon. The nave fragments from Bad Homburg and Weinheim-Nächstenbach were certainly broken intentionally, and the latter nave was further damaged by filing notches on its inner rim (Fig. 40, 1), but it is uncertain whether this necessarily indicates cult activity. At present it is impossible to define precisely the character of the late Urnfield hoards of western Europe. Further research is necessary to discover which represent cult depositions and which were deposited for more mundane reasons.

The many wagon fittings from hoards or single depositions testify to the important rôle played by the wagon in the Urnfield period. It is only rarely that the wagons were deposited in such a way that we can form some impression of their use. A few hints, particularly in northern Europe but also sporadically further south, point to a use of the wagon in cult.

Along with evidence for the wagon being part of a complex of cult symbols existing since the start of the Urnfield period ('wheel + vessel + waterbird'), our conclusions definitely indicate that the ceremonial wagon was first and foremost used in cult practices. Occasionally in the earlier Urnfield period the wagon played an additional rôle as a symbol of high status - in the graves of the Hart a. d. Alz group. Wagons, together with drinking services and weapons, later served as status indicators in many graves of the Hallstatt period. Although evidence for the precise use of the ceremonial wagon of the Early Iron Age in Central Europe is almost completely absent, the large quantity of information indicating a cult usage from neighbouring areas and from the Urnfield period, suggests a similar rôle for the Hallstatt wagon.

¹⁰ Seven '*Deichselwagen*' are known from the following locations: Pierstnica (formerly Groß Perschnitz), pow. Milicz; Kałowice (formerly Ober-Kehle), pow. Trzebnica; Ośno (formerly Frankfurt-Drossen), pow. Rzepin; 'Kreis Görlitz'; Eiche-Golm, Kreis Potsdam-Land; Burg, Kreis Cottbus. See Seger 1931; Kühn 1935, 360, figs 1-2; Gandert 1936, 196-7; Sprockhoff 1955, 88; 89, fig. 46, 2.4; Breddin 1961.

12.3 WHEELED VEHICLES IN VILLANOVAN ITALY

Compared with late Urnfield Central and Northern Europe, the use of ceremonial vehicles in contemporary Villanovan Italy is reflected in the archaeological record in a very different way: our evidence comes almost without exception from grave finds.

F.-W. von Hase noticed that the horse bits found in Villanovan and early Etruscan graves in Central Italy were almost always deposited as pairs. He interpreted this as an indication that the horses were used to draw vehicles (von Hase 1969, 53–4). The fact that at least 12 of the graves with paired horse bits also contained a *stimulus* (goad), and another grave had in addition two iron linchpins, makes von Hase's theory hard to contest. Together with *stimuli*, which were used to goad draught horses (e.g. Fig. 132, 3; Woytowitsch 1978, 108–11) and linchpins, pairs of horse bits were clearly used in the burial ritual to symbolize or betoken the provision of a wheeled

vehicle. One example for this *pars pro toto* rite, from Bologna, Benacci-Caprara grave 34, is shown on Fig. 132.

True vehicle-graves are first seen towards the end of the 8th century (e.g. Castel di Decima: Woytowitsch 1978, 34), and graves with *pars pro toto* linchpins appear at around the same time (e.g. Bologna, 'Benacci-Caprara', grave 39: *ibid.* 1978, 51, no. 104). On the other hand, the practice of furnishing a grave with paired harness for a team of draught horses was already common in the 8th century; according to the associated urn and fibula from Tarquinia, 'Poggio dell'Impiccato', grave 39, the practice is even attested for the end of the 9th century (von Hase 1969, 15, nos 60–61; 44, fig. 4B). The custom of including a *stimulus* or goad among the grave goods, which must likewise be interpreted as *pars pro toto* of a wagon, was also common in the 8th century BC – especially at Bologna, but also evidenced at Tarquinia, Veii and Volterra (Woytowitsch 1978, 108–11). We may therefore conclude that the concept of vehicle burial was already current in the 8th century BC. The distribution of these early finds, mostly *pars pro toto* horse bit pairs and *stimuli*, shows a marked concentration in Villanovan Etruria and Bologna¹¹ (Fig. 133).

Owing to the lack of wagon fittings we cannot be sure what sort of vehicles were betokened by the *stimuli* and paired horse bits in the 8th century. However, in the vast majority of 7th century graves the vehicles were two-wheeled chariots (Fig. 134), and some evidence suggests that the chariot also played a dominant rôle in the burials of the previous century. Thus a number of 8th century graves also contained small terracotta chariot models which, according to the opinion of some scholars, may have symbolized the deposition of a full-size vehicle (e.g. Tarquinia: Hencken, 1968, 535–7; Bologna, 'San Vitale', grave 23; Locri Epizephyrii, 'Patariti', grave 77: Woytowitsch 1978, 77, no. 191; 80, no. 207). The goad, known in Latin as *stimulus* and in Greek as *kentron* would also presumably have been used for driving chariot horses at speed, for example in racing or war, rather than for the slower four-wheeled wagon (see for example Lucke and Frey 1962, pls 63; 66; 75; but possibly depicted in use on a four-wheeled wagon on the Hochdorf *kline*, Fig. 142). Stary argued that the chariot was introduced to Etruria under the influence of Near Eastern contacts in the 8th century (1980). According to Stary, these contacts caused widespread changes in Etruscan warfare, and the chariot was put to use as a weapon in battle.¹² Some Villanovan and early Etruscan horse bits show unambiguous links with the Near East and in their area of origin they were certainly used on chariot horses (e.g. von Hase 1969, 41, fig. 1, 19).

Thus although we are lacking conclusive finds, all the circumstantial evidence points to the idea of the chariot, not the four-wheeled wagon, behind the 8th century

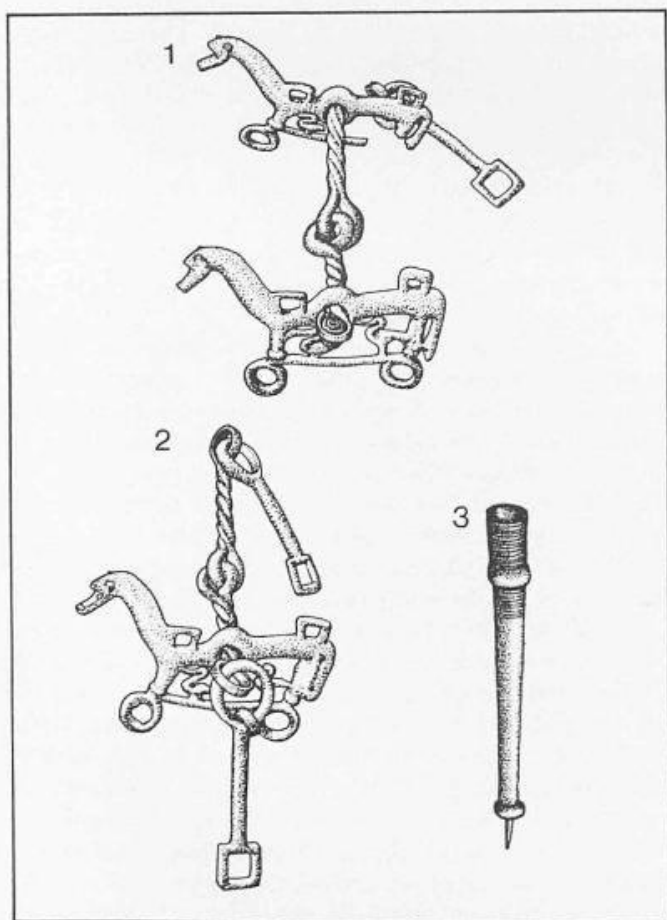


Fig. 132 Bologna, Benacci-Caprara, grave 34: pair of horse bits and stimulus (after von Hase 1969). – Bronze. – Not to scale.

¹¹ In this context we should also mention a grave from Stadlhof near Pfatten (Vadena) in South Tirol. The grave contained a bronze bit cast together with its cheek-pieces, some toggles from horse-gear, an angle-socket and some objects which could be felloe-clamps (Franz 1951, pls 9, 1.3.7; 12, 2–6). Presumably these finds represent the remains of a wagon-grave, which could date to Ha B3 in conventional terms.

¹² A slightly different explanation for the derivation of the earliest depicted Etruscan chariots is offered in Ch. 12.5.

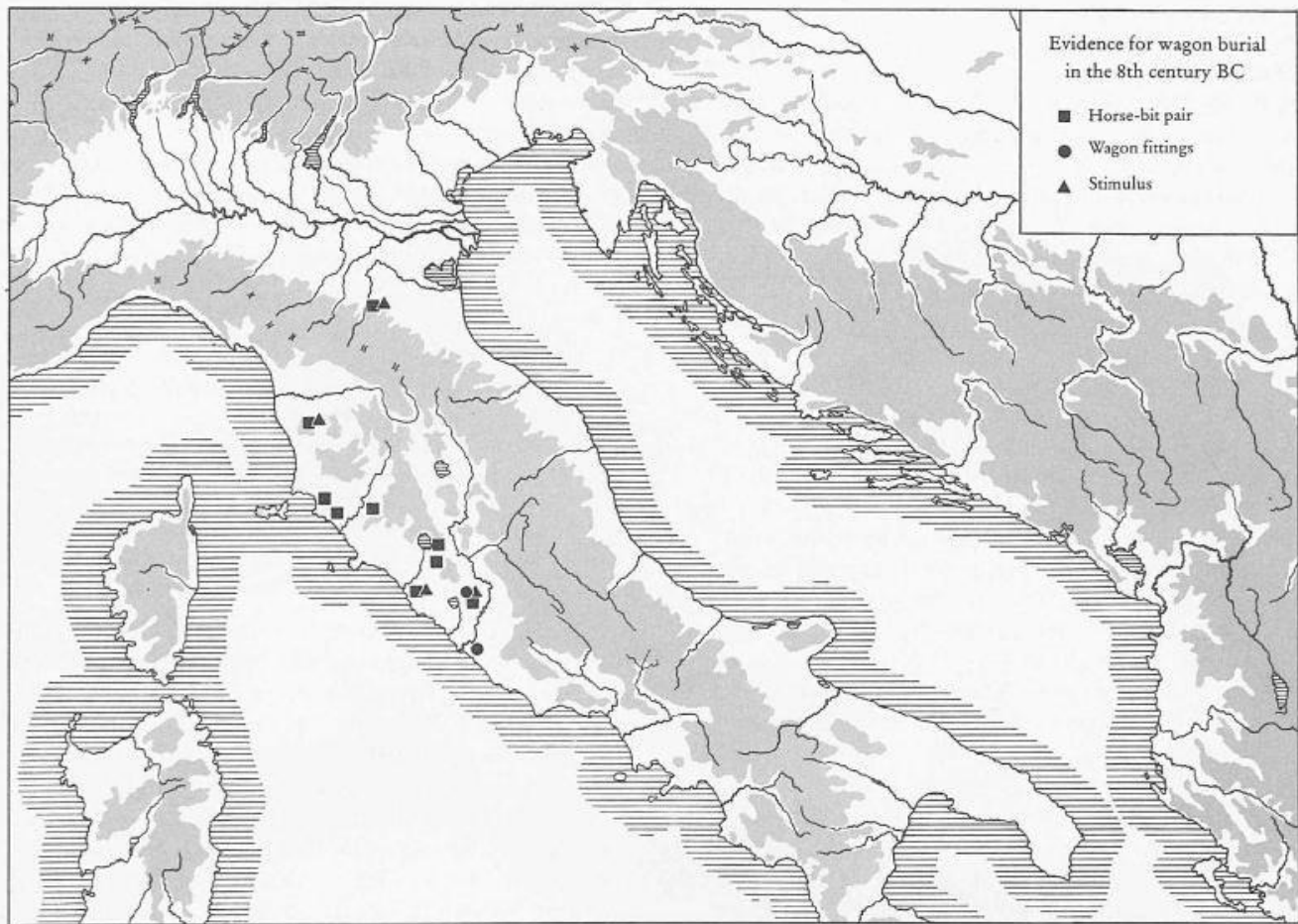


Fig. 133 The distribution of evidence for wagon burial in 8th century Italy.

Etruscan graves with paired horse bits and *stimuli*. It may be that this early stage of vehicle burial in Etruria can be linked to a number of other finds in the Mediterranean area, for example grave 27 from the Athenian Agora, dating to about 900 BC, which contained a pair of iron horse bits, again doubtless as *pars pro toto* of some kind of vehicle (Müller-Karpe 1962a, 127; 110, fig. 28, 7). The iron wheel fittings from Kerameikos grave 13, dating to the 9th century, suggest a two-wheeled vehicle, and could belong to the same widespread cultural trend (ibid. 1962a, 102, fig. 20, 4–5; 103, fig. 21, 9–10.13). Perhaps the four horses deposited in a grave alongside the main burial in the Lefkandi Heröon, dated even earlier, about 1000 BC, can also be regarded as a chariot team (Popham et al. 1982; Crouwel 1987, 115, note 124). Later graves, from Salamis and Huelva, 'La Joya', grave 17, with remains of full-size chariots, and Gordio tumulus K, with a pair of buried horses, could be evidence for the continuation and dissemination of this East Mediterranean tradition (Karageorghis 1967; 1973; Garrido Roiz and Orta García 1978; Young 1956, 266; pl. 96, fig. 57; for further Cypriote vehicle-graves, see Crouwel 1987, 101, note 11).

Thus there are some indications that the Villanovan and early Etruscan paired horse bit and *stimulus* graves could be rooted in a widespread East Mediterranean burial tradition. If this were so, then the practice of *pars pro toto* vehicle burial in Etruria would presumably be

inspired by the chariot, newly introduced in warfare and certainly well suited to the expression of power and social prestige. On the other hand, although most of the graves with paired bits and *stimuli* also contained weapons, a few graves from Bologna and Veii housed typical female goods, indicating that the wheeled vehicles not only had a warlike symbolic content (von Hase 1969, 55–6; see also Bartoloni and Grottanelli 1989; Galeotti 1988). Von Hase suggested the idea of the 'journey to the hereafter', arguing that chariots would be unsuitable for the *Ekphora* (see also Canciani 1984, 410).

The Villanovan and early Etruscan evidence raises questions of considerable importance for an understanding of the Central European wagon-graves of the Hallstatt period. Links between Hallstatt Central Europe and Etruria are indicated by the *pars pro toto* deposition of paired horse bits and linchpins in graves, and by the contemporary appearance in both areas of true vehicle burials. The first point to be made is that the Central European graves almost always housed four-wheeled wagons whereas in Etruria in the overwhelming majority of cases the vehicle was a two-wheeled chariot, certainly in the 7th century and probably also in the 8th century BC (Fig. 134). Therefore the north Alpine group cannot be regarded simply as an adjunct to the Central Italian distribution of vehicle-graves.

Graves with paired horse harness as *pars pro toto* of a

wagon are found in Central Europe from the very start of the Hallstatt period, as we have argued above for the graves from Chavéria tumulus 16 and the grave of 1894 from Lengenfeld (see Ch. 10.1). In Etruria, the earliest burial of this kind could be dated to the end of the 9th century (Tarquinia, 'Poggio del Impiccato', grave 39), and an even earlier example was mentioned from the Athenian Agora (grave 27, dating to about 900 BC). The Mediterranean region clearly had priority over Central Europe in this burial custom. But there are indications for the increasing importance of horses and wheeled vehicles in the 9th and 8th century in other parts of Europe. We should mention the earliest Italian bronze bits, from the Contigliano hoard, conventionally dated to the early 9th century BC, which look similar to the examples deposited in the 8th century in Villanovan graves (Bonomi 1970, 125, fig. 10, 10–12). The hoard contained two horse bits which seem to form a pair, and a third fragment which is of a slightly different type. And we have already discussed the area north of the Alps in the younger and later Urnfield period and noted relatively abundant wagon evidence in West and North Europe. Evidence for wagons was registered in those areas in large quantities in the later part of the Urnfield period, presumably indicating their increasing importance.

Indeed, there are certain features of ritual deposition held in common over wide areas of Europe which may be highly significant. The idea of representing ceremonial vehicles by *pars pro toto* depositions – most often paired harness, but sometimes *stimuli* or vehicle components – was described not only for graves in Villanovan Italy but also for hoards in the Nordic zone. In South Germany we mentioned the ritual deposition of the Bullenheimer Berg axle-caps, and in France numerous wheels of the Coulon group. We can possibly add some South German Ha B3 hoards with fragmentary wagon fittings of the Bad Homburg group or with paired harnessing (for the Bad Homburg group see Ch. 3.6; for paired horse-gear see for example Fridingen, Wallerfangen: Balkwill 1973).

If we can accept these depositional customs being related, but in different areas confined exclusively to either hoards or graves, then the Villanovan burials with objects provided as *pars pro toto* of ceremonial vehicles must be understood as part of a widespread European tradition. In turn, the burials of the Hallstatt period with paired horse-gear or linchpins could then be traced back to roots in the Central European Urnfield culture, and the appearance of the wagon burial rite would not necessarily be linked to Central Italian influences. This cannot be established with certainty, and the possibility must not be overstated. Nevertheless, considering the abundant evidence of four-wheeled ceremonial wagons in the Urnfield culture and the earlier wagon burials of the Hart a. d. Alz group, it would be foolhardy to underestimate the strength of local wagon traditions. At the same time,

we must take into account the indubitable links between the vehicle-graves of Hallstatt Central Europe on the one hand, and Villanovan and Etruscan Italy on the other: horse-gear graves with paired harness, graves with linchpins, the contemporary start of true vehicle burial. Therefore it seems necessary to find an explanation which covers the links of Hallstatt wagon-graves both with local Urnfield traditions, and with Villanovan and Etruscan burial rites. Two hypotheses can be put forward:

- 1) Villanovan graves with paired harness and linchpins represent East Mediterranean influence; the influences were transmitted to Central Europe where they caused a transformation in the local ceremonial wagon tradition and the start of wagon burial in Ha C.
- 2) The vehicles in Villanovan Italy were rooted in a widespread European tradition of ceremonial wagons and chariots, in which the vehicles were probably generally used in cult processions. The various regional practices of vehicle deposition (graves, hoards...) reflect the effects on this tradition of different religious attitudes.

It seems likely that both hypotheses contain an element of truth. For example the first possibility is supported by the appearance of wagon burial in Spain (Huelva, 'La Joya', grave 17), which was surely inspired by East Mediterranean influences, without an Urnfield or Etruscan agency (Garrido Roiz and Orta García 1978; Stary 1989). We should also mention the novel iron fittings used on Central European wagons of Ha C which, as we concluded in Ch. 11.2, were presumably derived from Etruria. As for the second possibility, we should mention the four-wheeled wagons from Cerveteri, 'Tomba Regolini-Galassi' and Veii, Monte Michele, grave 5 (Woytowitsch 1978, no. 31; Boitani 1983) and the depiction of a four-wheeled wagon on the throne from Verucchio (Fig. 148). These vehicles were presumably related to the Central European four-wheeled ceremonial wagons and probably indicate the survival of Urnfield traditions. The Italian *Kesselwagen*,¹³ and the depictions of four-wheeled wagons with waterbird protomes in Italy, also point to cult practices and symbols which had a long history in Central Europe (Figs 123; 153). But the strongest argument for a local, Central European source for most of the ritual traditions in Europe involving ceremonial vehicles, is the sheer quantity of archaeological evidence for such wagons throughout the Urnfield and Hallstatt periods (see for example Figs 22; 134).

P. F. Stary (1980) argued that the two-wheeled battle chariot was introduced to Italy by the Phoenicians during the 8th century as a component of a new set of weaponry deriving from the East Mediterranean. And U. Höckmann (1982, 155) suggested that the historically-attested privilege of vehicle driving in Etruria and Latium can be explained by the use of the chariot in battle in the 7th century BC. If the Etruscan ceremonial vehicles, and perhaps therefore even the vehicle fittings, '*stimuli*' and

¹³ Note the stylistic parallels linking the Balkan '*Kesselwagen*' (e.g. Figs 124, 1; 125–6) and some unprovenanced models from Italy, which point to a related symbolism, particularly their sickle-shaped bird protomes and pyxis-like shape (Woytowitsch 1978, pls 27, 141; 29, 142). The vessel-bearing wagon models from Italy and the Balkans show the survival of old symbols and symbolic combinations (wagon, vessel, bird, now sometimes the horned bird). These survivals can only be the remnants of Urnfield traditions.

paired harness found in Central Italian graves (fig. 133), are to be understood as emblems of a social class which originally drove chariots in battle, then Central European wagon burial must surely be interpreted differently – mainly because the four-wheeled wagons of the Urnfield and Hallstatt periods could never have played an effective rôle in warfare. It is obviously important to distinguish two different traditions of wheeled vehicle use: 1) primarily in cult processions (ceremonial wagons); 2) primarily in battle (chariots). Both types of vehicle could, however, be used as symbols of social status, as demonstrated by many rich graves.

12.4 WAGON-GRAVES OF THE EARLY IRON AGE

Now, with the background of the Urnfield and Villanovan evidence, we can turn our attention to the wagons of the Hallstatt period. Naturally graves with remains of real wagons are most important, but we have also been able to recognise a number of graves with just a few metallic wagon components (especially linchpins) deposited as *pars pro toto* of a wagon (Ch. 8.4). These two categories of burial have been collected here in the catalogue and, for the area studied, amount to a total of 228 graves (14 more graves have been discovered subsequently: see the Addenda to the catalogue). A number of other wagon-graves from outside the area of study can be added: four to the west, from France (La Côte-Saint-André, Quinçay, Savigné, Sublaines)¹⁴ and three from the east, from Hungary and Yugoslavia (Szentcs-Vekerzug grave 13; Atenica, tumuli I and II)¹⁵. About 100 further vehicle-graves have been uncovered in the area south of the Alps (Woytowitsch 1978; for additions, see Galeotti 1988, 94, note 1; Veii, Monte Michele: Boitani 1983; Castelletto Ticino: Gambari 1988). Further afield wagon-graves are much less common, with isolated examples known from southern Spain (Huelva, 'La Joya', grave 17: Garrido Roiz and Orta García 1978; for a general survey of Spanish wagon-graves, see Stary 1989), Thessaly (Ayios Georgios: Tziáfalias 1978), Cyprus (Salamis: Karageorghis 1967; *ibid.* 1973; Amathus, Palaepaphos, Tamassos: Crouwel 1987, 101), Phrygia (Gordion tumulus A: Kohler 1980) and possibly the Ukraine (Krasnoe Znamja, near Stavropol, Mogila 1: Kossack 1986, 127–8; Petrenko 1980; *ibid.* 1983, 47, fig. 41). The distribution of wagon-graves is shown on Fig. 134.

This chapter will also examine graves containing horse harness but no wagon fittings (horse-gear graves); their importance for our study becomes apparent when one considers that the horse-gear provided in a grave must have betokened either the ridden horse or the draught horse. The burial of harness from draught horses could

then be interpreted as the *pars pro toto* deposition of a wagon, analogous to the deposition of linchpins or *stimuli*. Obviously it is crucial to distinguish between graves with harness from ridden horses and those with harness from draught horses.

In Central Europe, as in Villanovan Italy, horse-gear graves regularly contain harness for pairs of horses (Fig. 135; see Appendix). Sometimes the grave goods also included yoke fittings, making it quite clear that the harness was for draught horses (e.g. Belgium: Court-St.-Etienne, tumuli A and 4; Holland: Oss; France: Saulces-Champenoises; Germany: Albstadt-Tailfingen, Frankfurt-Stadtwald [Fig. 136], Riedenburg-Haidhof tumulus VIII, Thalmässing, Unterwiesacker tumulus 4, Vöhringen; Czechoslovakia: Lovosice grave III, Plaňany grave 5 [Fig. 137]).

The lay out of the goods in horse-gear graves often seems to take account of an imaginary wagon. Compare the plans of the Frankfurt-Stadtwald and Plaňany graves (Figs 136–7) with those of Hradenín graves 24 and 46 (Figs 206; 210). By the south side of the Frankfurt and Plaňany chambers was a yoke, to the north of which was an inhumation burial positioned with its head towards the south; by the right side of the inhumation was a sword pointing to the south. Apart from the fact that there is more space between the inhumation and the yoke, and that they also included metallic wagon fittings, the Hradenín plans are almost identical. The organisation of all four graves seems to exhibit the same underlying design: the corpse borne on a wagon (real, imaginary, or made of wood without metal fittings) drawn by a pair of horses (symbolized by paired harness and a yoke) and always heading towards the south.

Many plans of horse-gear graves could be mentioned exhibiting the same lay out. The following graves will serve as examples: Tannheim tumuli IX and XIII (Geyr and Goessler 1910, 37, fig. 18; 44, fig. 23); Großebstadt, cemetery I, graves 2, 3, 5 and 7 (Kossack 1970, pls 46; 52; 71; 79); Mindelheim tumulus 7 (Kossack 1959, 168, fig. 27); Kolaje, grave 3 of 1903 (Sedláčková 1973, 134, fig. 6). We can conclude that the graves with paired horse harness generally show a remarkable similarity to wagon-graves: the grave plans often exhibit the same design, with the underlying idea of the body being carried on a horse-drawn wagon.

Our discussion has drawn attention to two facts which suggest that the paired harness in Central European graves can be interpreted as symbolizing draught horses: 1) some horse-gear graves also contained yokes; 2) the plans of horse-gear graves correspond closely with those of wagon-graves, and often seem to have had space reserved for an imaginary wagon.

Fig. 135 shows the distribution of horse-gear graves from the 8th to the 6th century BC (see Appendix). The map includes graves without wagon components but with

¹⁴ La Côte-Saint-André: Chapotat 1962. – Quinçay, 'Camp de Séneret': Joffroy 1958, 146–50; Tauvel 1973, 237; Mohen 1980, 310; Pare 1989b. – Savigné, 'tumulus du Gros-Guignon': Joffroy 1958, 134–45; Tauvel 1973, 237; Mohen 1980, 310–11. – Sublaines: Cordier 1968; *ibid.* 1975.

¹⁵ Szentcs-Vekerzug, grave 13: Páducz 1952, 145–6. – Atenica: Djuknić and Jovanović 1966.

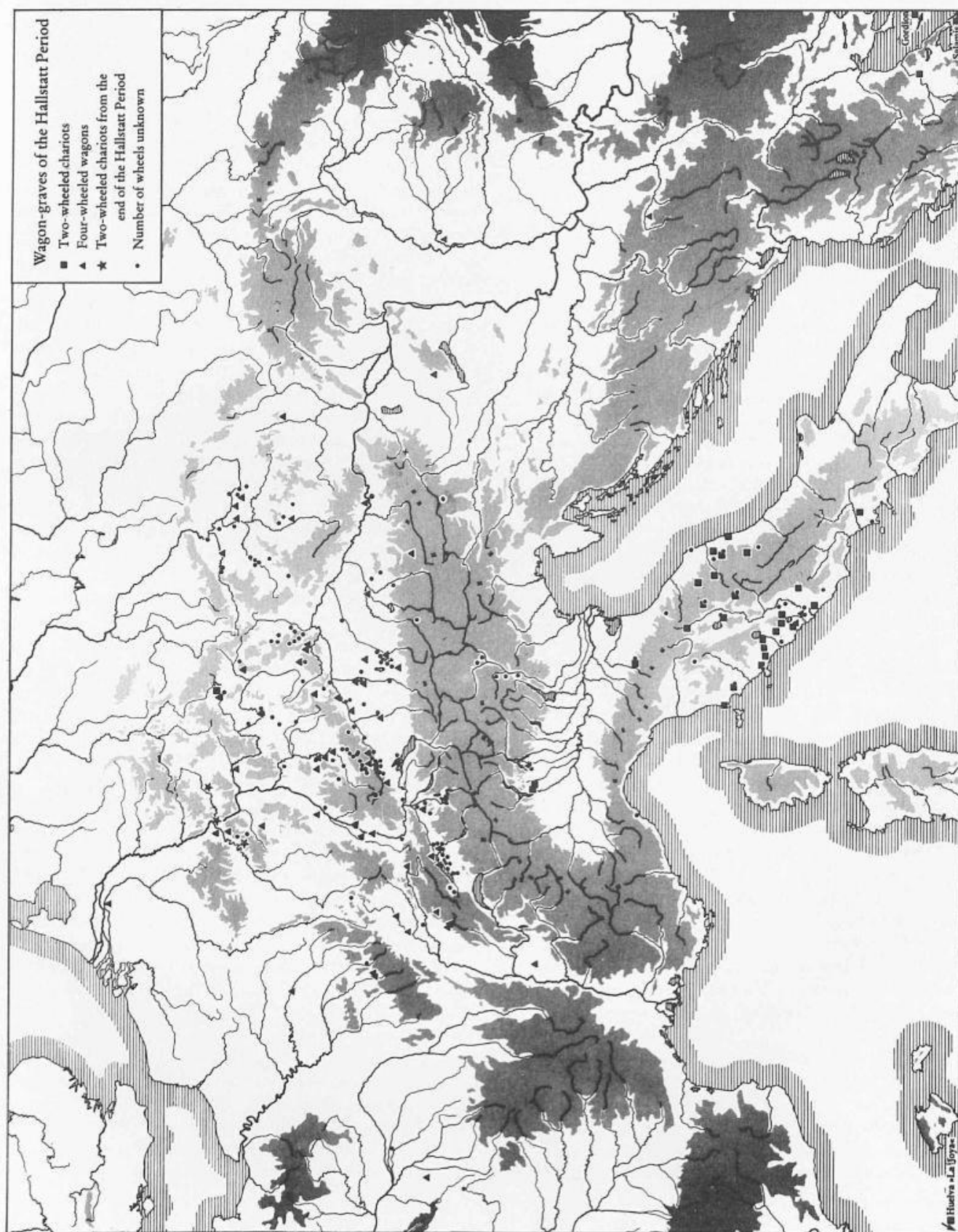


Fig. 134 The distribution of the wagon-graves of the Hallstatt period.

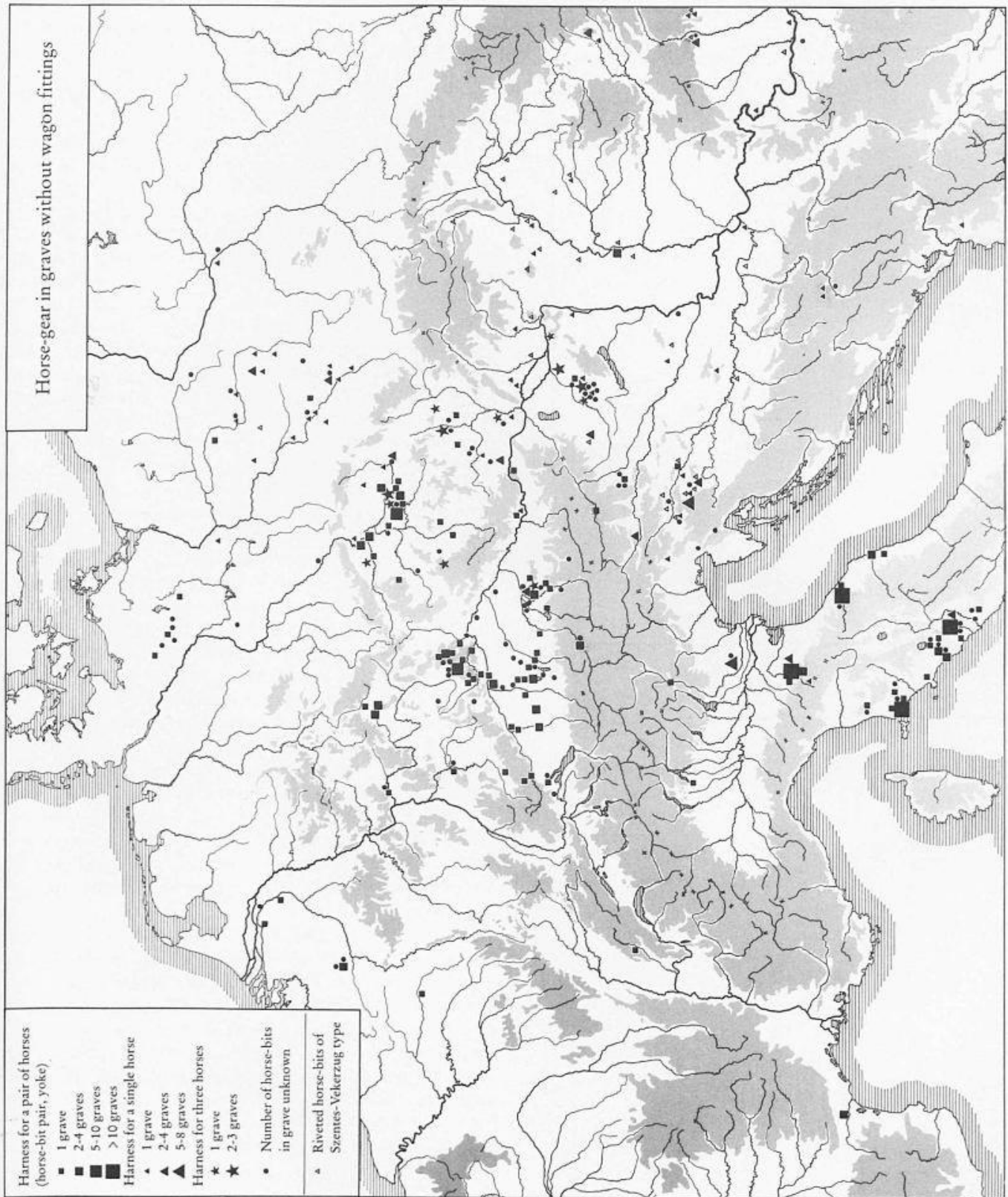


Fig. 135 The distribution of horse-gear in graves without wagon fittings (see Appendix).

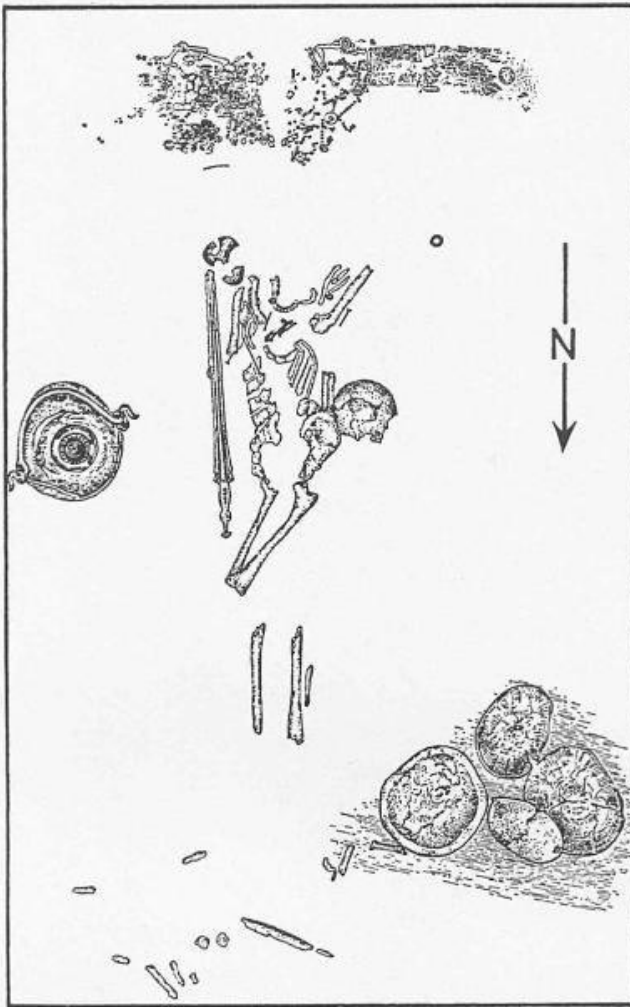


Fig. 136 Frankfurt-Stadtwald: plan of the grave with rich horse-gear (after U. Fischer 1979).

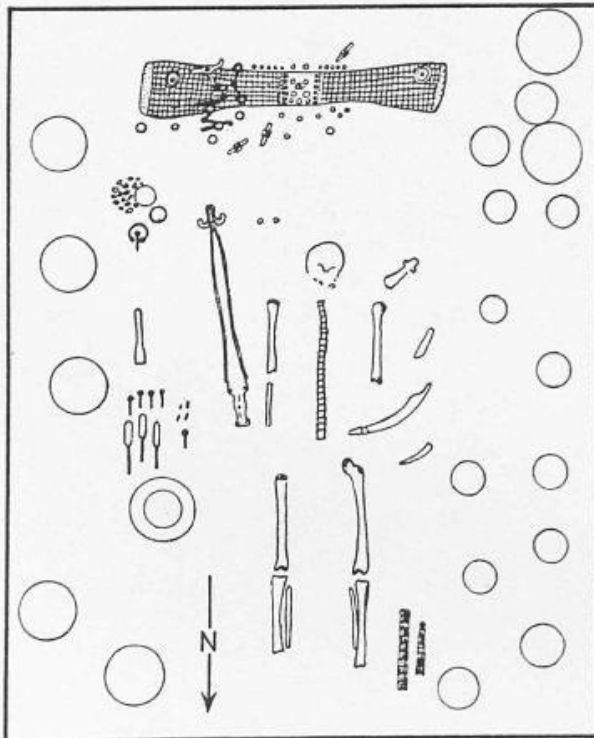


Fig. 137 Plaňany, Bohemia: plan of grave 5 (after Dvořák 1933, fig. 21).

horse bits, cheek-pieces or yoke fittings. While in many cases it was not possible to establish the exact amount of harness originally deposited in the grave, numerous well excavated graves allow a clear distinction between a western part of Central Europe in which graves contain harness for a pair of horses, and an eastern part in which graves contain harness for a single horse (Fig. 135). At the border between these two areas there is a narrow contact zone containing both sorts of grave or, more rarely, with harness for three horses.

Graves with paired harness are found in two main concentrations: Etruria and the area north of the Alps (South Germany, Upper Austria and most of Bohemia). Smaller groups of such graves are found in Picenum, in the area around Bologna, on the southern fringe of the Alps, in Brandenburg, on the lower Meuse and in the Brabant. A few rather isolated graves have been found in France: Saulces-Champenoises, Chavéria and Mailhac. Common to this whole area is the observation that well excavated horse-gear graves always contain harness for a pair of horses. It should be stated, however, that the interpretation of horse-gear graves from old excavations is somewhat subjective. While the reports of graves from these areas sometimes only mentioned a single horse bit, it is in these cases always true that either the quality of the excavation was very poor or the grave had already been disturbed, strongly suggesting that the excavated grave *ensemble* was incomplete. With these arguments in mind, I think it is justified to conclude that in the area described the horse-gear deposited in graves betokened draught horses; in contrast, the ridden horse, which may quite possibly have played an important rôle in the life of the deceased, was never represented among his grave goods. Now the burial of harness from draught horses must be understood as *pars pro toto* of a wheeled vehicle. Indeed the area just described, with horse-gear graves containing paired harness, corresponds very closely with the distribution of wagon-graves (compare Figs 134 and 135). Clearly there were different ways to express the concept of vehicle burial: 1) the deposition of a complete wheeled vehicle, 2) the deposition of selected vehicle components (most commonly linchpins), and 3) the deposition of harness from the vehicle's draught horses (paired bridlery and sometimes the yoke).

Further east on the distribution map, several concentrations can be seen with horse-gear graves containing harness for a single horse (Fig. 135): between the Oder and Warta, the Great Hungarian Plain, Transdanubia and Slovenia. Smaller groups of graves are found in north-east Bohemia (Platěnice culture), Transylvania, Walachia and in the area of the Este culture. In some cases horse burials are also found, a burial custom most frequently attested in Slovenia (see Bökönyi 1968, 11–16: Brezje, Magdalenska Gora, Stična etc.) and the cemeteries of the Vekerzug Group (e.g. Szentes-Vekerzug: Párducz 1952; 1954; 1955) but also occasionally elsewhere, for example in Nagysomló-Doba grave 1 (dated to Ha C by the sword and cheek-pieces of Kossack's type Ib: Darnay et al. 1895), Bologna, San Vitale, graves 760 and 770 (Pincelli and Morigi Govi 1975, 462; 450, fig. 35;

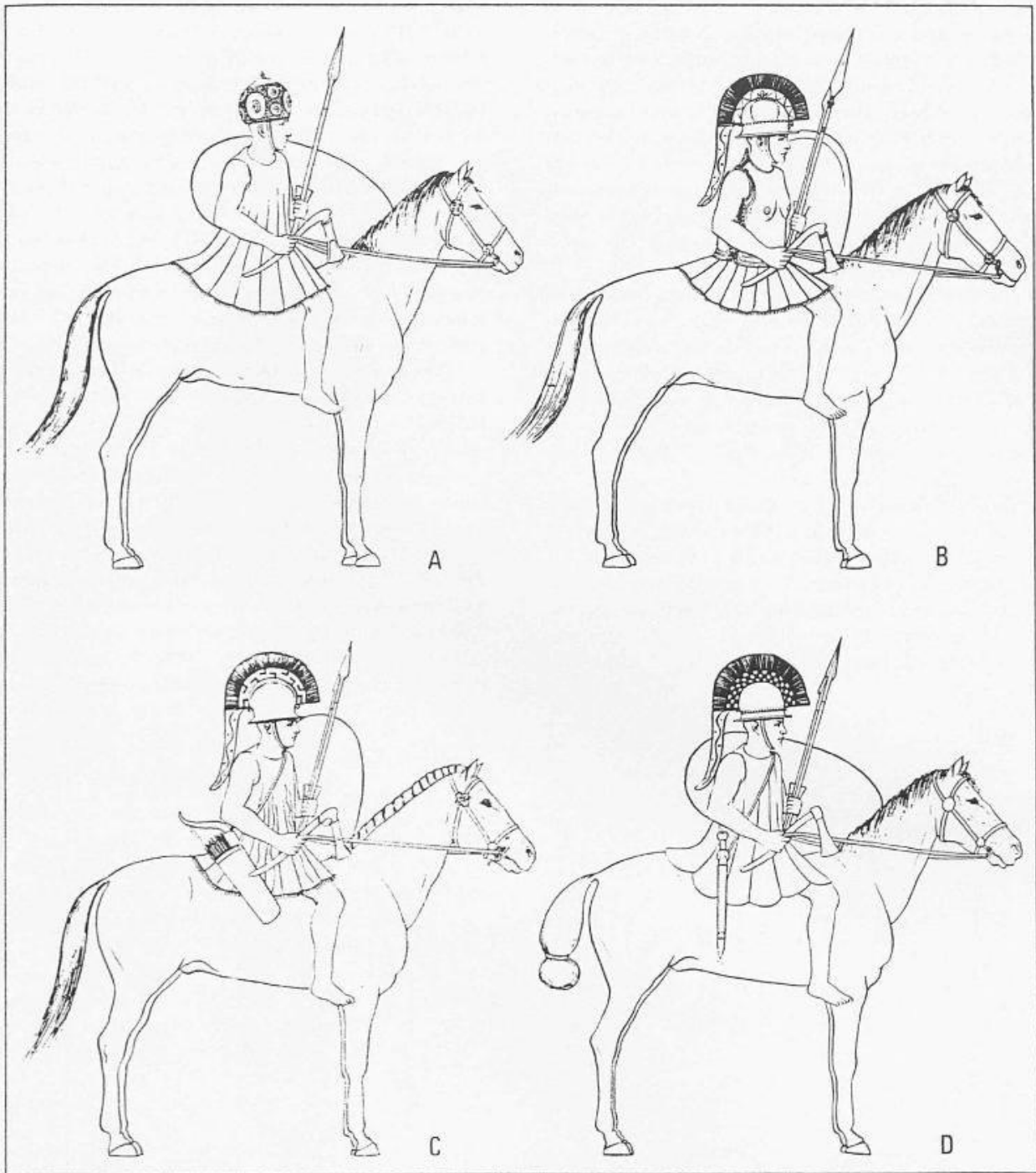


Fig. 138 Weaponry of horse-riders of the Hallstatt period from lower Carniola (after Egg 1984).

469; 466, fig. 37) and Sofronievo (Hänsel 1976, 172).

The fact that the graves contained harness from just one horse seems to exclude the possibility that the harness was meant to betoken draught horses. Thus the harness in wagon or chariot graves is always paired and on pictorial representations of this date wheeled vehicles are almost always drawn by pairs of horses (see for example Figs 142; 144–5; 149–50). There is therefore little doubt that these burials can be described as horse-rider graves. Von Hase offered the same interpretation for the graves with single bits from Este (1969, 53–4), and M. Egg published

convincing reconstructions of the equipment of four horsemen from Slovenian graves of the 7th and 6th centuries BC (Fig. 138).

It remains to mention approximately 17 graves containing harness for three horses. These come from Transdanubia, Moravia and Bohemia and are therefore located on the border between the distributions of wagon-graves and horse-rider burials (Fig. 135). It may seem over-simplified, but the most likely interpretation of these graves is that they represent the *pars pro toto* deposition of both ridden and draught horses. In fact, harness for a

third horse was also occasionally provided in Bohemian wagon-graves and in these cases the bits were always positioned in two groups: a pair representing the draught horses and, some distance away, a single bit for the ridden horse (e.g. Figs 206; 210). F. Dvořák likewise suggested the interpretation that this represented the provision of a third, ridden horse alongside the wagon with its draught team (1938b, 94–5). In well excavated graves without wagon fittings, when the horse bits were found *in situ*, they were also generally positioned in two groups: a pair and a single bit (e.g. Holásky tumulus 2; Hradenín grave 12).

The graves with three bits are a clear manifestation of the integration of two burial customs. Whereas in the east the deceased was buried as a horse-rider or, judging from the weapons often found in the graves, probably as a mounted warrior, in the west it was the deceased's wagon-driving status which found expression in the grave furnishings.

The distribution map on Fig. 135 includes graves from the 8th to the 6th century, along with the characteristic horse-gear of Vekerzug type which continued in use throughout the 5th century BC. The two traditions of horse-gear burial were remarkably long-lived, continuing over the whole period both in the east and the west: the border between the two regions remained constant for over 300 years.

The earliest horse-rider burials are dated to the so-called 'Thraco-Cimmerian' horizon of Pontic-Caucasian influence. Examples can be mentioned in Hungary from Füzesabony grave 3, Mezőcsát grave 52 and Pécs-Jakabhegy tumulus 1, in Bohemia from Předměřice and Zábřeh, in Slovakia from Posádka, Santovka (Fig. 139) and Senica, in Carinthia from Frög tumulus K, and in Romania from Balta Verde tumulus 2 and Gura Padinei. Most of these graves contain elements of 'Thraco-Cimmerian' horse-gear and it is possible that some of the 'Thraco-Cimmerian' hoards with horse trappings uncovered in the Carpathian Basin could in fact represent remnants of graves or cemeteries (e.g. Fig. 139). As for the grave from Mezőcsát, the associated pottery vessels have not been published, and it is necessary to rely on Patek's dating of the Mezőcsát group to the 'Thraco-Cimmerian' horizon (e.g. Patek 1974).

The chronology of the period between the 'Thraco-Cimmerian' and 'Scythian' horizons is presently rather poorly understood. Whereas the 'Scythian' horizon in the Carpathian Basin was previously held to begin around the middle of the 6th century (the princely grave from Ártánd), recent research on the rich Scythian tumuli from Kélermes has raised the possibility of dating the earlier 'Scythian' material in the Carpathian Basin back into the 7th century (Kossack 1986). While steppe influence in Central Europe was previously assigned to two separate

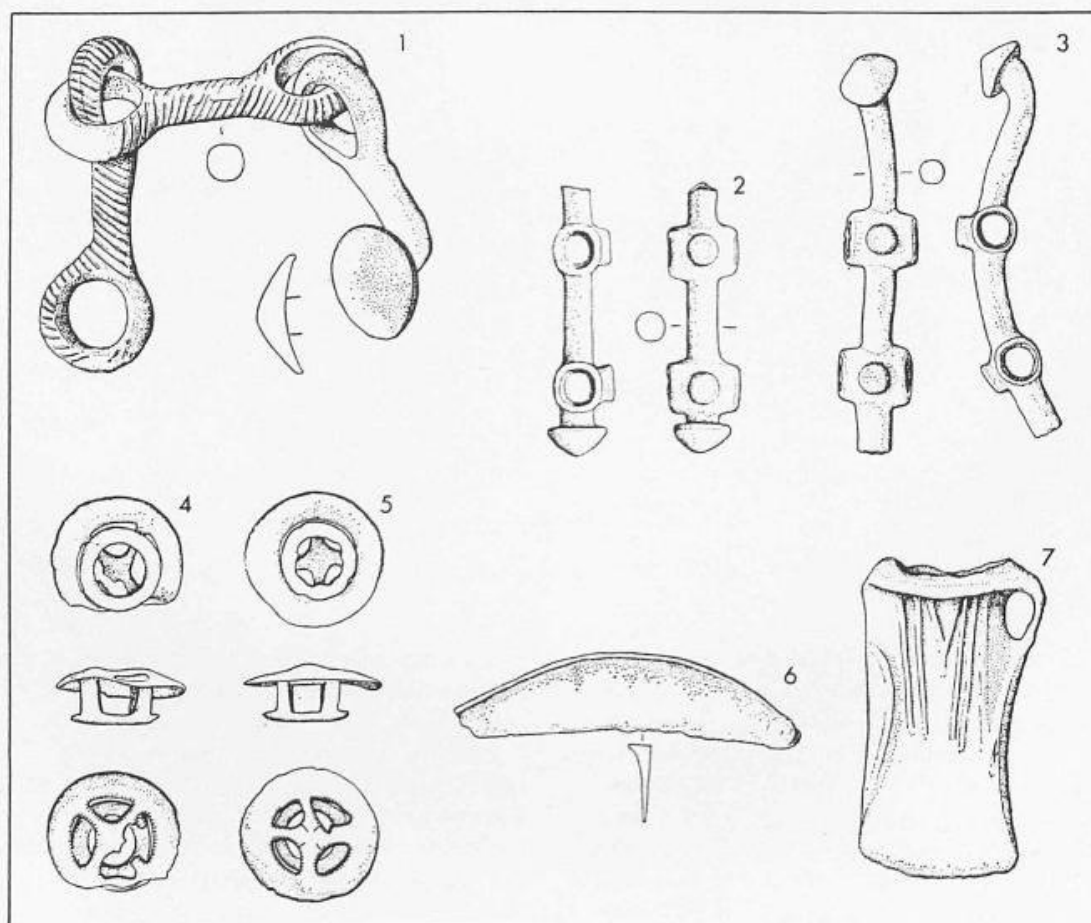


Fig. 139 Santovka, Slovakia: bronze objects from a grave or hoard (after Nevizánsky, 1985). – Scale 1:2.

chronological horizons ('Thraco-Cimmerian' and 'Scythian'), it now seems likely that the Carpathian Basin remained in contact with the east in the 7th and early 6th centuries too. We should therefore speak of a 'Thraco-Cimmerian' horizon in the 9th and 8th centuries BC, immediately followed by a 'Scythian' horizon, starting in the 7th century. Later, a local type of 'Scythian' culture formed in the Carpathian Basin, towards the end of the 6th century BC (Vekerzug group).

Thus the cheek-pieces from Ferigile, tumulus 27, grave 1 are closely paralleled in Kelermes Kurgan 2/Vesselovskij (compare Vulpe 1967, pl. 21, 6 with Galanina 1985, 112, fig. 10, 14–5) which Kossack assigned to the first half of the 7th century BC (Kossack 1986, 129 – the grave contained a fragment of a double-ringed horse bit of Novočerkassk type: see Galanina 1985, 92, fig. 3, 14). It should also be remembered that the Vekerzug material from Ferigile (Akinakes, riveted horse bits of Vekerzug type) is restricted to the northern end of the cemetery, which represents its latest phase of use (Vulpe 1977, 81ff.; 95, fig. 3, C). The southern end of the cemetery contains numerous horse-rider graves (including the example from tumulus 27), and these should all be dated before the start of the horizon typified by the late 6th and 5th century Vekerzug group. An absolute date for the start of the Ferigile cemetery is suggested by the shape and decoration of some pottery vessels, showing a definite relationship to the Basarabi culture, and indicating a beginning in the first half of the 7th century BC. The horse-rider graves 3 and 31 from Săliște, Moldavia, can probably be assigned a date even earlier than the start of the Ferigile cemetery (Vulpe 1986, 88, fig. 17, 10–14; 89, fig. 18, 5–9).

The Ferigile cemetery is particularly important for us because it shows a continuous tradition of horse-rider graves from the 7th to the 5th centuries BC. We should also recall the contacts with the South Russian steppes, manifested not only by the cheek-pieces from tumulus 27 but also by the shaft-hole axe from tumulus 71, compared by A. Lang to South Russian examples from the 7th century (Lang 1980, 231–2). Perhaps the horse-rider grave from Tigveni, 'Babe', tumulus 15 containing cheek-pieces with animal protomes in early 'animal style' can now also be given an early date, following Kossack's chronological arguments (Popescu and Vulpe 1982, 98, fig. 18, f). It is also relevant to note the cheek-pieces from Ferigile tumuli 41 and 69 and Cepari tumulus 5, with parallels in a Geometric layer at Kalapodi (compare Vulpe 1967, pl. 21, 2–3; Popescu and Vulpe 1982, 86, fig. 11, d; with Donder 1980, 115 and pl. 11, 98A.98B). Before leaving Romania we should mention the horse-rider grave from Cristești and the two graves from Cipău, which could be assigned to a chronological phase parallel with the earlier, southern part of the Ferigile cemetery (note the cheek-pieces from Cipău grave of 1908 and Cristești: Gallus and Horváth 1939, pl. 59B, 3–4; Crișan 1965, 60, fig. 12, 1–2; and the pottery from Cipău grave VIII: Vlăssă 1961, 30, fig. 9).

Further to the west, the horse-rider grave from Ritopek in Serbia can be dated to the 7th century on account of the cheek-piece, related to Kossack's type Ib (Todorović 1966, pl. 2, 13). The cheek-pieces from Kaptol, tumulus IV, grave 1 are likewise similar to type Ib and, owing to the other grave goods, a date in the second half of the 7th century seems most suitable (Vejvoda and Mirnik 1973, pl. 2, 5). The Bosnian rider graves from Osovo and Čitluci have been dated by Benac and Čović to their phase IVc, corresponding to the late 7th century BC (Benac and Čović 1957, 100–8). In Slovenia, horse-rider graves are well known in the 7th and 6th centuries, for example from Magdalenska Gora, Novo Mesto and Stična (for example Fig. 138).

A number of horse-rider graves dating before the Vekerzug group can also be recognised in Hungary: the grave found in 1939 at Ártánd, Nagysomló-Doba grave 1, and the recently published graves from Százhalombatta and Vaskeresztes. The Polish group of horse-rider graves is more difficult to date, with many examples remaining unpublished.¹⁶ However, Bystrzyca grave 2 contained a rhomboidal belt-hook which further south would be dated to Ha D1 (Seger 1902, 27, fig. 28), and the goods from Kuniów grave 9 and Wrocław-Ksiejewie Wielkie grave 172 are clearly not late in the Hallstatt period (Gedl 1962, pl. 19, 1–15; Glaser 1937, pl. 8, II).

The Vekerzug group itself is represented on our distribution map by riveted horse bits of Szentes-Vekerzug type (Fig. 135). This cultural group has recently been the subject of studies by J. Chochorowski, who set its inception in the late 6th century (see for example Chochorowski 1985). These horse bits are mainly distributed in the Great Hungarian Plain with regional concentrations, sometimes in local variants of the type, in Slovenia, Transdanubia, Slovakia and Walachia (Fig. 135). The Vekerzug group of horse-rider graves continued into the 5th century, attesting to the long tradition of this burial rite in eastern Central Europe.

In the course of our discussion we have mentioned evidence for cultural contact with the South Russian steppes. Indeed, we were able to find evidence of contact not only in the 'Thraco-Cimmerian' and Vekerzug horizons, but also in the graves of the 7th (e.g. links with the Kelermes horse-gear) and earlier 6th centuries (e.g. the grave of 1939 from Ártánd). These eastern contacts have an important part to play in our interpretation of the horse-rider graves, considering the fact that the distribution of these graves in the main coincides with the distribution of intrusive Pontic-Caucasian types. We may take as an example the Este culture, where so-called '*Knopfstensen*' (von Hase 1969, 39–40; pl. 20, 252–4) and spectacle-shaped rein-knobs (von Hase 1969, 47, fig. 7, 7; Frey 1969, pl. 3, 3) can be taken as evidence for eastern influence. Of course we do not claim direct contact with the Pontic-Caucasian area, but '*Knopfstensen*' were certainly originally developed there, and then transmitted to the Carpathian Basin (see Kossack 1954a, 123, map 2;

¹⁶ The author is very grateful to Mirosław Kruszyński, who generously provided information on the Polish horse-gear graves. See also Kruszyński 1986.

157, list F; Potratz 1966, 204, note 1; Foltiny 1962, 115) and the rein-knobs are related to Hüttel's type Aržan (Hüttel 1981b). It can be no coincidence that in the Este area these types of horse-gear were used in horse-rider graves whereas, as we have explained above, elsewhere in Italy the horse-gear in graves was regularly for a pair of draught horses and 'Thraco-Cimmerian' influence was absent.¹⁷

Turning to the area north of the Alps we can also register a general lack of 'Thraco-Cimmerian' forms in the zone of wagon burial, corresponding to the situation observed in Villanovan Italy. The following finds mark the western extent of the steppe influences: Haslau-Regelsbrunn, Parndorf, Stillfried, Stockern, Černoín, Štramperk, Třtěno, Hostomice, Zábóří, Předměřice, Steinkirchen, Brunnenthal, Urach and Zürich-Alpenquai (Kossack 1954a; Podborský 1970b; Adler 1986, figs 188–191; Kluge 1986; Lochner 1991, pl. 94, 1). Thus the area north of the Alps did not share the steppe contacts evidenced by the 'Thraco-Cimmerian' horse-gear in the Carpathian Basin. Instead the former area adopted the rich 'Ha C1' horse trappings which, judging from their geographical distribution (Fig. 101, a–d), were predominantly developed locally (Fig. 100, 1–2.6–15; some types may have originated in the Carpathian Basin: Fig. 100, 3–5).

This stands in stark contrast to the situation further to the east, where we found that the harness in the horse-rider graves displayed continual contacts with the South Russian steppes, not only in the 'Thraco-Cimmerian' horizon and in the Vekerzug group but also throughout the 7th and early 6th centuries.

This is of great importance for our study of wagon-graves. Firstly, it is now quite obvious that the wagon burial rite was not introduced as a product of eastern, steppe influence (compare for example Kimmig and Rest 1954, 186). Fig. 135 shows that in East Europe warriors were buried as horse-riders not wagon drivers – in a continual tradition reaching back to the 'Thraco-Cimmerian' horizon (9th and 8th centuries BC).¹⁸ We may also note that the types of horse-gear derived from steppe influence did not include trappings specifically for draught horses (Fig. 100, 8–15). These types are completely lacking in the Carpathian Basin (Fig. 101, c–d). In fact the eastern limits of the distribution of 1) wagon burials (Fig. 134), 2) burials with paired harness (Fig. 135) and 3) yoke fittings (Fig. 101, d) are almost identical: this borderline marks the westernmost extent of strong Pontic-Caucasian influences.

Secondly, our discussion provides an explanation for the question why wagon burial was not practised further

to the east in the Hallstatt period. The question is of some interest considering the important rôle obviously played by wagons in eastern Central Europe in the Urnfield period (see Ch. 3 and Fig. 22). Bearing in mind that in the Iron Age wagon burial was only practised in regions where eastern, steppe influences were lacking, it seems that the steppe influences were the cause of the absence of wagon-graves. Perhaps we can interpret this as a cessation or alteration of Urnfield traditions in a manner observed in the 9th and 8th centuries in many other aspects of culture in the Carpathian Basin, leading Kossack to write the following conclusion to a discussion of this period: 'In allen diesen Merkmalen öffneten sich die Karpatenländer dem Schwarzmeerraum, ihre bis dahin lebhaften Beziehungen nach Westen brachen so gut wie vollständig ab' (Kossack 1981, 37; see also pp. 36–7; 42). Here is not the place for an attempt to explain these changes, wagons and horse-gear being only a small and perhaps unrepresentative cultural element. Kossack mentioned the introduction of iron and warlike ('Thraco-Cimmerian') invasions as two possibilities, but he also stressed that there is little evidence to justify such theories. It should be emphasised here that the steppe influences in Eastern Europe persisted over more than four centuries and doubtless affected different areas in different ways. In the Este culture and in Slovenia, for example, the novel horse trappings and horse-rider graves were not accompanied by fundamental alterations in local cultural traditions.

Our discussion of the distribution map on Fig. 135 has once again underlined the importance of a strong Central European cultural tradition. The radical changes of the 9th and 8th centuries in the Carpathian Basin seem to have caused the end of the local wagon tradition: in the 8th, 7th and 6th centuries the Carpathian Basin is chiefly characterised by horse-rider graves (Fig. 135). But the changes in the east serve to emphasise the continuity further to the west – in Central Europe and Central Italy.

While the Hallstatt wagon can only be understood as part of a widespread and old tradition of ceremonial and cult, much evidence points to an important additional rôle for the wagon as a status symbol, as its frequent occurrence in rich graves seems to demonstrate.

Of great importance for our understanding of this question are the so-called '*Fürstengräber*' (princely graves) of the phase Ha D which, towards the end of the period (Ha D2/3), are distinguished by containing gold neck-rings and bracelets. The standardised selection of funerary goods in these graves is very noticeable. Apart from elements of costume, we are chiefly concerned with

¹⁷ Exceptions include the fragmentary cheek-piece of Kossack's type Ia in the Piazza S. Francesco hoard from Bologna (von Hase 1969, pl. 11, 121) and the unprovenanced Italian '*Knopftrense*' with horse-shaped cheek-pieces and spectacle-shaped rein-knobs related to the Aržan type (ibid. 1969, pl. 6, 57).

¹⁸ Horse-rider graves have an even longer history in the South Russian steppes. In the Černogorovka phase horse bits were deposited singly in graves, whereas in the following Novočerkassk phase and in the Kelermes period numerous horse bits and even horses were provided for the dead. The author is grateful to U. Dietz, Heidelberg, for information about South Russian horse-gear. Note that ancient writers know the Cimmerians and Scythians above all as mounted archers (see for example Herodotus IV, 46).

wagons, weapons and services of pottery or bronze vessels for drinking and feasting.¹⁹ Considering the uniformity of the assemblages in graves with gold rings, one is tempted to interpret them as the expression of a definite funerary ritual, practised over a large area of Central Europe. Furthermore, earlier graves (now of course without gold rings) can also be cited with a very similar selection of grave goods, with wagons, weapons and vessel sets – not only in Ha D1 but also in Ha C. Throughout the Hallstatt period, in particular areas, one encounters a similar situation: the most prominent tumulus graves, distinguished for example by large size or special location, are characterised by rich vessel sets, wagons or weapons. We can take the second cemetery from Großesbstadt, Unterfranken, as an example (Fig. 140): here the wagon-graves (graves 2, 4 and 14) and the graves with paired horse-gear (graves 6, 17 and 19) are characterised by the inhumation burial rite, numerous pottery and bronze vessels, large rectangular grave pits and tumuli, whereas the other graves are mostly flat cremations with simple furnishings.²⁰

Both at the beginning as well as at the end of the Hallstatt period, we find a series of graves containing all three of these types of object, now forming a complete set. This type of burial presumably expressed the status of the most elevated social class. No doubt the objects symbolised important aspects of the deceased's social position: the weapons symbolising the warlike aspect, the vessel-sets probably symbolising duties as a host, and the wagons perhaps symbolising ceremonial, religious or lawgiving rôles.

This combination of goods has a traditional character which, in graves like Hart a. d. Alz, was already known in the Urnfield period. Each class of object (swords, later daggers; vessel sets; wagons) played an important rôle in burial and votive rites throughout the whole of the Late Bronze and Early Iron Ages. Although they were therefore accorded symbolic meaning for a long period, their use underwent important changes. In the Hallstatt period, for example, much evidence points to the use of the wagon, along with weapons and vessel sets, as a status symbol. The following review of Hallstatt burials shows how these status symbols became increasingly exclusive during Ha C and D – reflecting the social changes leading up to the extreme political and economic centralisation evidenced at the end of the period by the famous 'Fürstengräber' and 'Fürstensitze' (for a more complete discussion of this topic, see Pare 1989b). The following table shows the increasing rarity of wagon-graves and horse-gear graves (i.e. graves without wagons but with

yokes and/or harness); the table comprises graves in South Germany (Bavaria and Baden-Württemberg):

	<i>Wagon-graves</i>	<i>Horse-gear graves</i>	<i>Total</i>
Ha C	46	45	91
Ha D1	36	10	46
Ha D2/3	20	0	20

In the older Hallstatt period wagon-graves are mainly distributed in Central Bohemia, Bavaria and on the Swabian Alb (Fig. 108). Along with horse-gear graves (Fig. 135), symbolising a team of horses and therefore a wagon, these graves form a dense and remarkably uniform group, with 91 examples in South Germany alone. The graves were almost always primary burials under a tumulus and were regularly provided with rich vessel sets and often with a sword. While in south-west Germany in the older Hallstatt period the provision of wagons and horse-gear was chiefly restricted to the Swabian Alb and the Hegau, a few graves (probably dated to an advanced phase of Ha C), indicate an adoption of this burial custom on the Upper Rhine and in Switzerland. These graves, from Ohnenheim, Gündlingen, Blotzheim, Birnenstorf and Ins, mostly contain elaborate wagon fittings of type 4, which are chiefly distributed in the north-west Alpine area (Fig. 89). With the appearance here of a local tradition of wagon construction, which came to flourish in the later Hallstatt period (see especially Figs 90–91), the first signs of the later importance of the north-west Alpine area become apparent.

In Ha D1 horse-gear graves become much less common. A survival of this burial rite is only evidenced by a few grave finds, such as Obernricht in Bavaria and Eugendorf-Kirchberg in the Salzburg region (see Appendix). Compared to the older Hallstatt period, wagon-graves are also more rare, with 36 examples in South Germany. The graves are now concentrated on the Swabian Alb, and only sparsely distributed in Bavaria and Bohemia. In this phase the Hallstatt culture of the Swabian Alb experienced a *floruit*, with numerous rich graves.

Rich vessel sets in the Alb-Hegau style were still provided in graves of Ha D1, for example in the wagon-graves from Bitz, Ebingen and Winterlingen. The pots are now almost always accompanied by bronze vessels (e.g. in the grave from Vilsingen) and in some cases (e.g. Kappel tumulus 3; Hohmichele grave VI), the pottery vessels are largely or even completely replaced by vessels made of

¹⁹ While graves with gold rings probably always had vessel sets, wagons and weapons were frequently but not always provided. These grave assemblages have recently been collected in a table by M. Egg (1985a, 382, fig. 43). The table needs correction in several places. According to S. Schiek, Hundertingen tumulus I, grave 1 had a large bronze cauldron and, according to E. Paulus, the same was true for grave 5 (Schiek 1956a, 54; 57). The excavations of the tumulus of Payerne uncovered not only a gold neck-ring and a wagon in the princely grave, but also fragments of bronze sheet. These bronze fragments have not been preserved and it is not certain, but quite probable, that they represent remains of bronze vessels (see Drack 1964, 50ff.).

²⁰ The plan shows the state of excavation in 1981: grave 1 is exceptional, with a grave chamber and tumulus but without wagon fittings or horse-gear; grave 8 was destroyed and the original contents were not preserved. See Wamser 1981b.

bronze. But, in general, vessel sets are less common in graves of Ha D1 than previously, in Ha C.

The following table shows a similar development in the provision of elaborate weapons in Hallstatt graves (the table comprises graves in South Germany; dagger-like knives [*Dolchmesser*] are not included):

	<i>Swords</i>	<i>Daggers</i>	<i>Total</i>
Ha C	205	1	206
Ha D1	1	41	42
Ha D2/3	0	17	17

Compared to Ha C, when sword-graves were very numerous (205 examples in South Germany alone), in Ha D the provision of weapons became less consistent and more dependent on local traditions (Sievers 1982, 57ff.); and the increased number of burials with spears complicates the picture.²¹ But it can hardly be doubted that the dagger, as an outstanding weapon often distinguished by elaborate workmanship and decoration, continued the function of the sword as a status indicator in burial rites. Furthermore, in her thorough treatment of weapon-graves, S. Sievers drew attention to a decrease in the provision of weapons during Ha D. At the same time the burial customs became more uniform, whereby in Baden-Württemberg daggers became almost totally restricted to the so-called 'Fürstengräber' (Sievers 1982, 93ff.). The increasing rarity of graves with elaborate weapons (swords and daggers) is illustrated in our table (see above). While both at the start and at the finish of the Hallstatt period the sword or dagger was certainly characteristic of the most elevated male burials, the graves with spears should not be forgotten: the number of late Hallstatt weapon graves is clearly higher than expressed in the table. Nevertheless it is possible to note a general restriction of the provision of elaborate weapons in the Hallstatt period, until the final phase (Ha D2/3), when the provision of elaborate daggers is reserved for a handful of very rich graves.

With the complete absence of horse-gear graves, the idea of wagon burial in the phase Ha D2/3 is only represented by the provision of a real wagon. In South Germany this practice is evidenced by 20 graves. They can now often only be described as luxury vehicles, as for example the elaborate inlaid decoration of the wagon from Quinçay very clearly shows (Fig. 71a; Pare 1989b). A corresponding development can also be observed in the provision of sets of vessels for feasting and drinking. The large sets of pottery vessels provided in elevated graves in earlier phases are now replaced by fewer, more valuable

vessels made of bronze. Apparently the bronze vessels undermined the prestige value of the pots, so that the latter no longer sufficed as status symbols. Parallel with this development, vessel sets were provided in far fewer graves.

Finally we must mention the construction of tumuli. Alongside vessel sets, wagons, horse-gear and weapons, burial under a large tumulus can be regarded as characteristic of elevated burials throughout the Hallstatt period. Considering that primary burial under a tumulus was typical for Ha C, and secondary burial for Ha D, it is clear that tumuli were built much less frequently in Ha D (Zürn 1987, 20ff.; 26f.). Finally, in the phase Ha D2/3, primary burial under a tumulus became a rare honour in burial ritual.

Our discussion of burial rites leads to the conclusion that the provision of vessel sets, wagons, horse-gear and elaborate weapons, as well as primary tumulus burial, all became rarer during the Hallstatt period, whereby these status symbols became increasingly exclusive. Because the funerary emblems of the highest social group remained largely the same during this time, it seems justified, in agreement with S. Sievers (1982, 129), to interpret this as a 'concentration of power'. The increasing exclusivity of this burial rite, which was previously (in Ha C) relatively common, offers an explanation for some of the profound changes (e.g. decreasing provision of pottery, increase of secondary burials...), which mark the development of burial rites during the Hallstatt period.

Alongside the wagon's symbolic or cult function, we can therefore recognise an additional rôle as a status symbol. From the inception of the four-wheeled wagon at the start of the Urnfield period, the wagon could be linked to an elevated, weapon-bearing social group: in the archaeological record this is reflected in the phases Br D, Ha A1, Ha C and Ha D.

12.5 PICTORIAL REPRESENTATIONS OF WHEELED VEHICLES

It is interesting to compare the distribution of wagon-graves with that of vehicle representations (Figs 134 and 141). The distribution of vehicle representations includes certain new areas, especially Slovenia and Pomerania, where wagon finds are otherwise unknown.²²

Only two wagon depictions are known from the main area of distribution of wagon-graves of the Hallstatt culture: on the Hochdorf *kline* (Fig. 142) and on a pottery vessel from the cemetery of Fischbach-Schirndorf (Fig.

²¹ In south-west Germany in Ha D1 there was an increase of weapons in graves, caused by the frequent provision of spears. Spears, instead of swords or daggers, were also found in graves with wagons and vessel sets, for example in Bad Cannstatt grave 1, with a gold neck-ring, and in the Ha C2 grave from Augsburg-Kriegshaber. For weaponry in South Bavaria see Kossack 1959. For a study of weapon graves, see Sievers 1982, 57ff.

²² For the Italian depictions, see Woytowitsch (1978) and Fig. 148. For situla art see Lucke and Frey 1962. References for the other depictions on Fig. 141 are given in the text, except for Dobřice (four-wheeled wagon drawn by a pair of horses – engraved on a bone fitting, probably a knife handle: Neustupný and Neustupný 1961, pl. 60; Schráníl 1928, pl. 41, 27) and the chariot fibulae from Slovenia and South Tirol: Mechel (Gehring 1976, pl. 1, 9); Vinica, Vače (von Merhart 1934, pls 21, 113; 29, 140); Magdalenska gora, Most na Soči/S. Lucia (Fig. 146; Müller-Karpe 1962b, 107, fig. 2, 1–2).

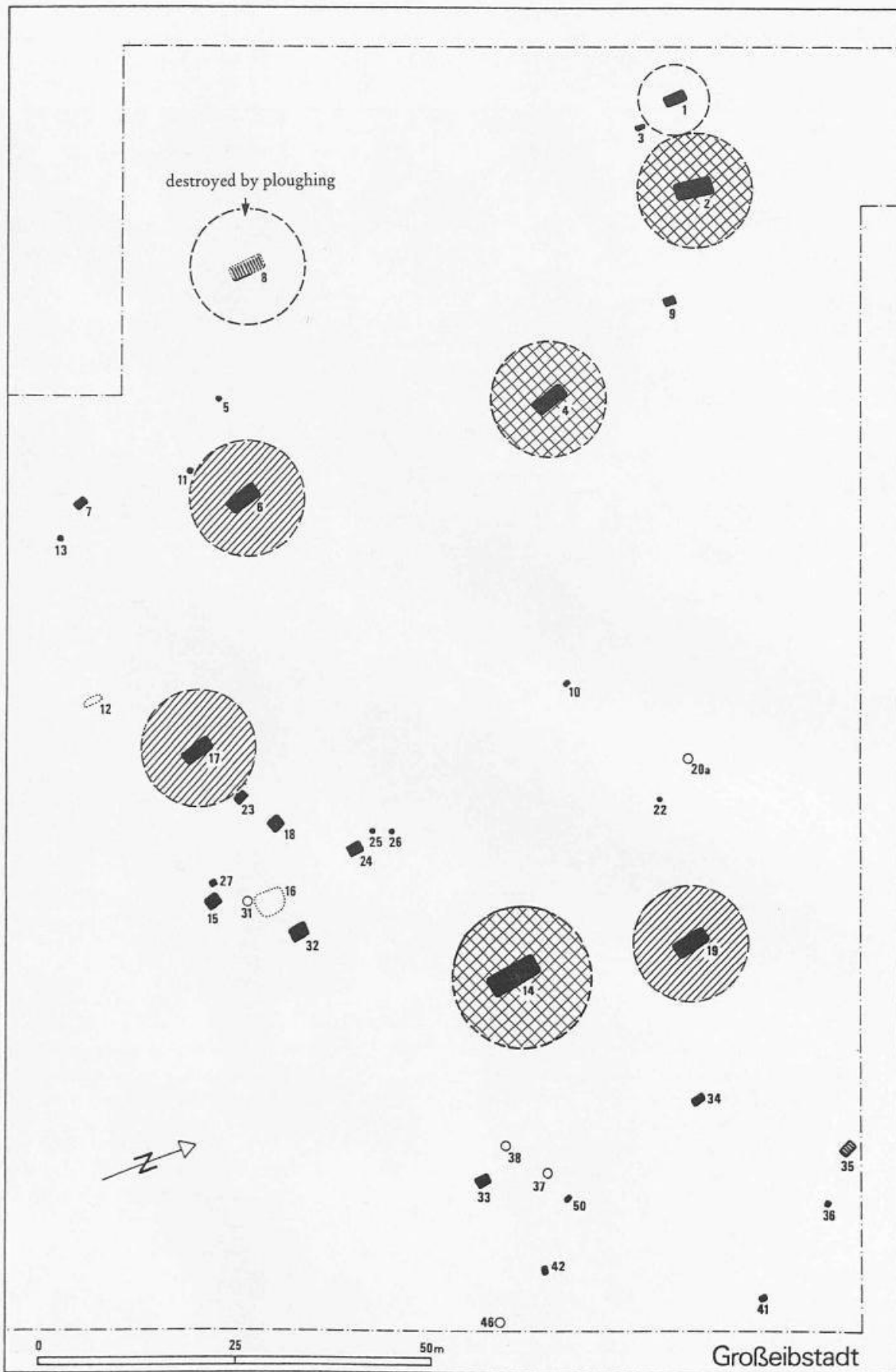


Fig. 140 Großeibstadt, cemetery II (state of excavation in 1981). — Cross-hatching: wagon-graves; simple hatching: graves with paired horse-gear. — The other graves are mostly flat cremations (after Wamser 1981b).

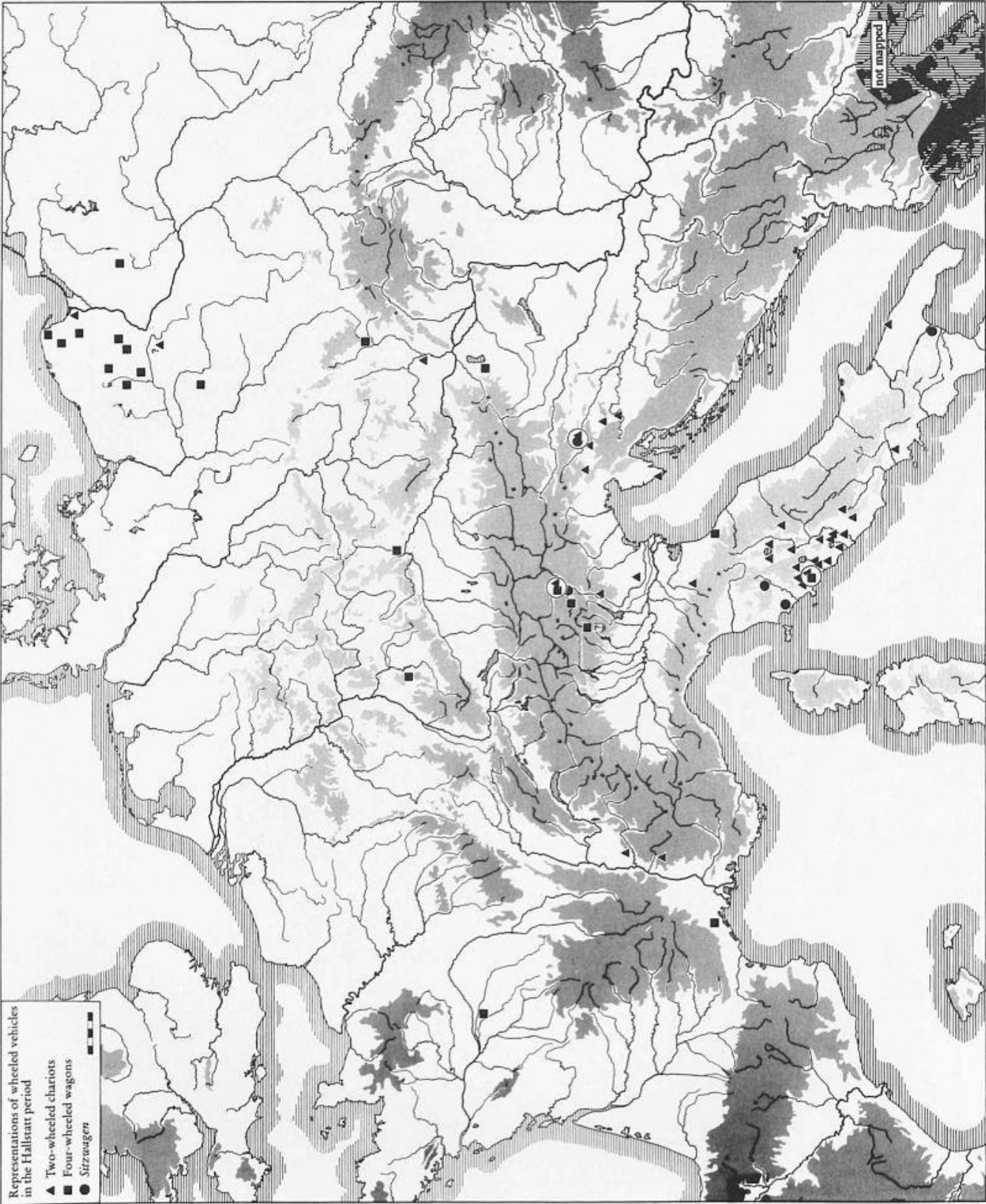


Fig. 141 The distribution of vehicle depictions of the Hallstatt period.

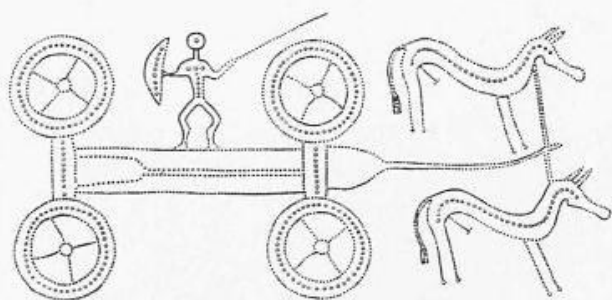


Fig. 142 Eberdingen-Hochdorf: representation of a wagon from the bronze Kline (after Biel 1985b).

143). However, the figural representations on the Hochdorf *kline* are probably, like the *kline* itself, of south Alpine workmanship (Frey 1989). The decoration on the Schirndorf vessel is likewise untypical for South Germany. The sequential arrangement of the motifs on the neck of the vessel seems almost to have a narrative quality, a method of representation which is best paralleled in the Kalenderberg culture.

Two vessels with wagon depictions from Sopron count among the most developed products of Kalenderberg art

(Fig. 144). The objects on the wagons can with great probability be interpreted as human figures. In addition the depictions include hunting scenes, lyre players, 'supplicatory' figures and 'dancers'; vessels on conical bases (Fig. 144, A2) may form part of a drinking scene.

The wagon depictions on the Pomeranian face-urns are in some respects similar to those from Sopron. Human figures are shown standing on the wagons from Lindebuden (Fig. 145, 1), Witankowo (Fig. 145, 2), Grabowo (formerly Grabau, Fig. 145, 3), Bukówiec (Fig. 145, 4) and possibly Elganowo (formerly Lamenstein, Fig. 145, 5). The depictions on the vessel from Witankowo (Fig. 145, 2) seem to include a hunting scene and the same may be true for the urns from Wymysłowo and Ostróski (La Baume 1963, pls 16, 691; 27, 1258). Other depictions seem to represent processions, for example Krosinko (formerly Klein-Krössin, *ibid.* 1963, pl. 12, 479), Darżlubie (formerly Darslub, Fig. 145, 6), Grabowo (Fig. 145, 3) and Borucina (Podgórski 1982, 26, fig. 2; 27, fig. 3; 28, figs 4–5).²³

Naturally we should recall our discussion above of the Nordic zone, and the evidence there for the use and deposition of cult wagons and elaborate trappings from pairs of draught horses. We have already mentioned the attractive possibility that the face-urn depictions illustrate



Fig. 143 Fischbach-Schirndorf, tumulus 87: wagon representation on a conical-necked vessel (after Dannheimer et al. 1982).

²³ Six four-wheeled wagon depictions are shown on Fig. 145. The remaining five or six depictions are listed above, in note 9. A depiction of a two-wheeled vehicle is known from Ostróski, pow. Gdańsk (La Baume 1963, pl. 16, 691).

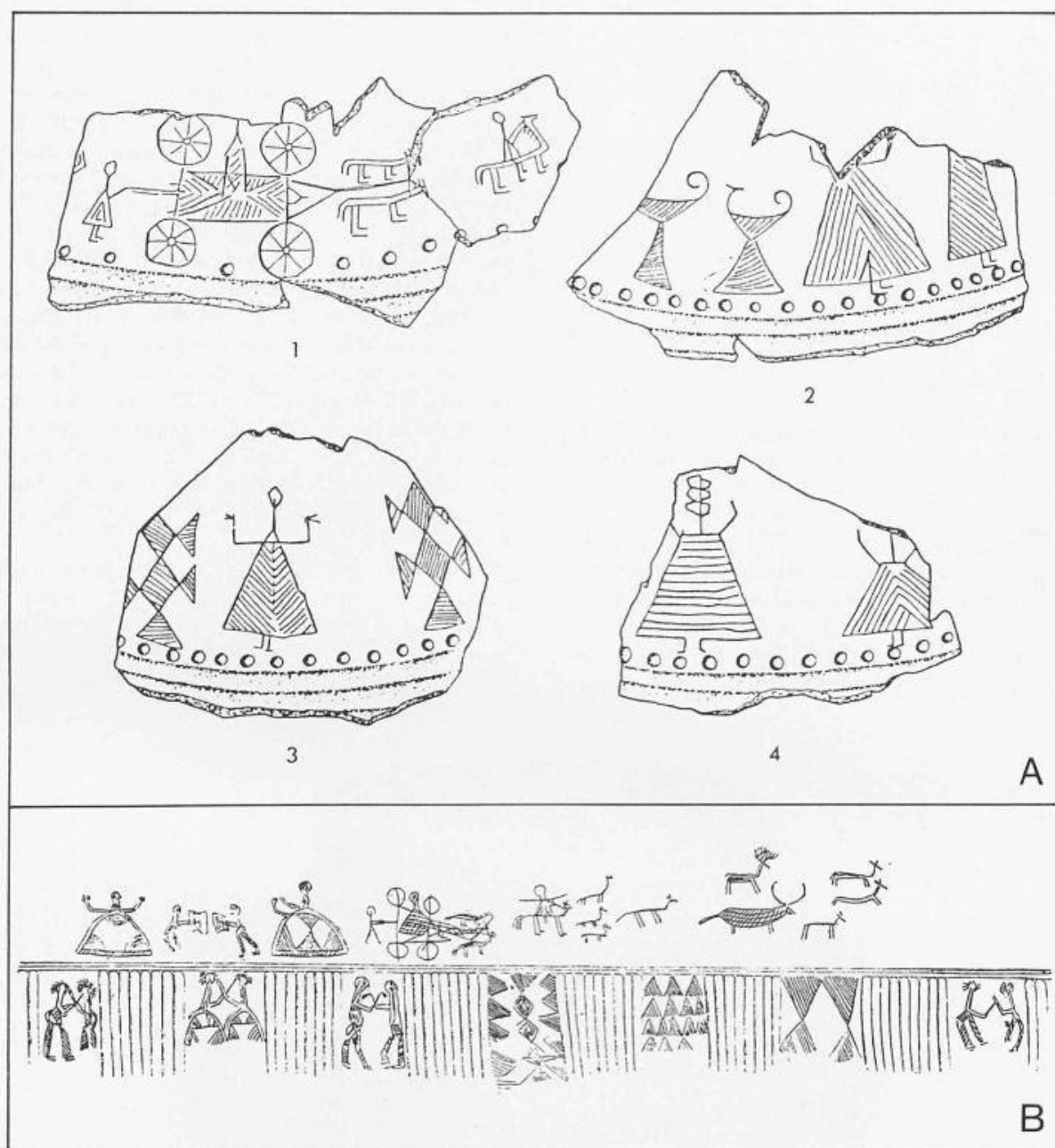


Fig. 144 Sopron, Hungary: wagon depictions from pottery vessels: A Tumulus 140, B Tumulus 127 (A after Dobiat 1982; B after Gallus 1934).

activities which were reflected earlier in the archaeological record by such cult depositions. It is difficult to accept that the Sopron and face-urn depictions simply represent funeral processions and four-wheeled hearses – the wild animals on the vessels from Witankowo (Fig. 145, 2) and Sopron tumulus 127 (Fig. 144B) would certainly not be covered by that explanation. As an alternative we must postulate cult activities involving processions (Figs 144A, 1; 145, 6), the hunt (Figs 144B; 145, 2), drinking (Fig. 144A, 2), music and dancing (Figs 144A, 3–4; 144B;

possibly 145, 3). It is important to stress this point because these finds seem to illustrate the sort of ritual and ceremonial functions which we have suggested for the wagons previously in this chapter.

The vehicle depictions in the south Alpine area are again difficult to interpret. Nevertheless the representations in Situla art and on chariot fibulae (e.g. Magdalen-ska Gora, Fig. 146) are an important source of information.²⁴ In South Tirol both four- and two-wheeled vehicles are represented. In Slovenia, by contrast, where

²⁴ Note that apart from the chariot fibulae from Slovenia and South Tirol (see note 22), there are related fibulae from Este. But it is typical that the examples from Este represent horse-riders rather than chariot drivers – again emphasizing the importance of horse-riding in the Este culture and the minor rôle of wheeled vehicles. See Müller-Karpe 1962b, 104f.; 107, fig. 2, 3–4; Fogolari and Frey 1965, pl. 62, b.

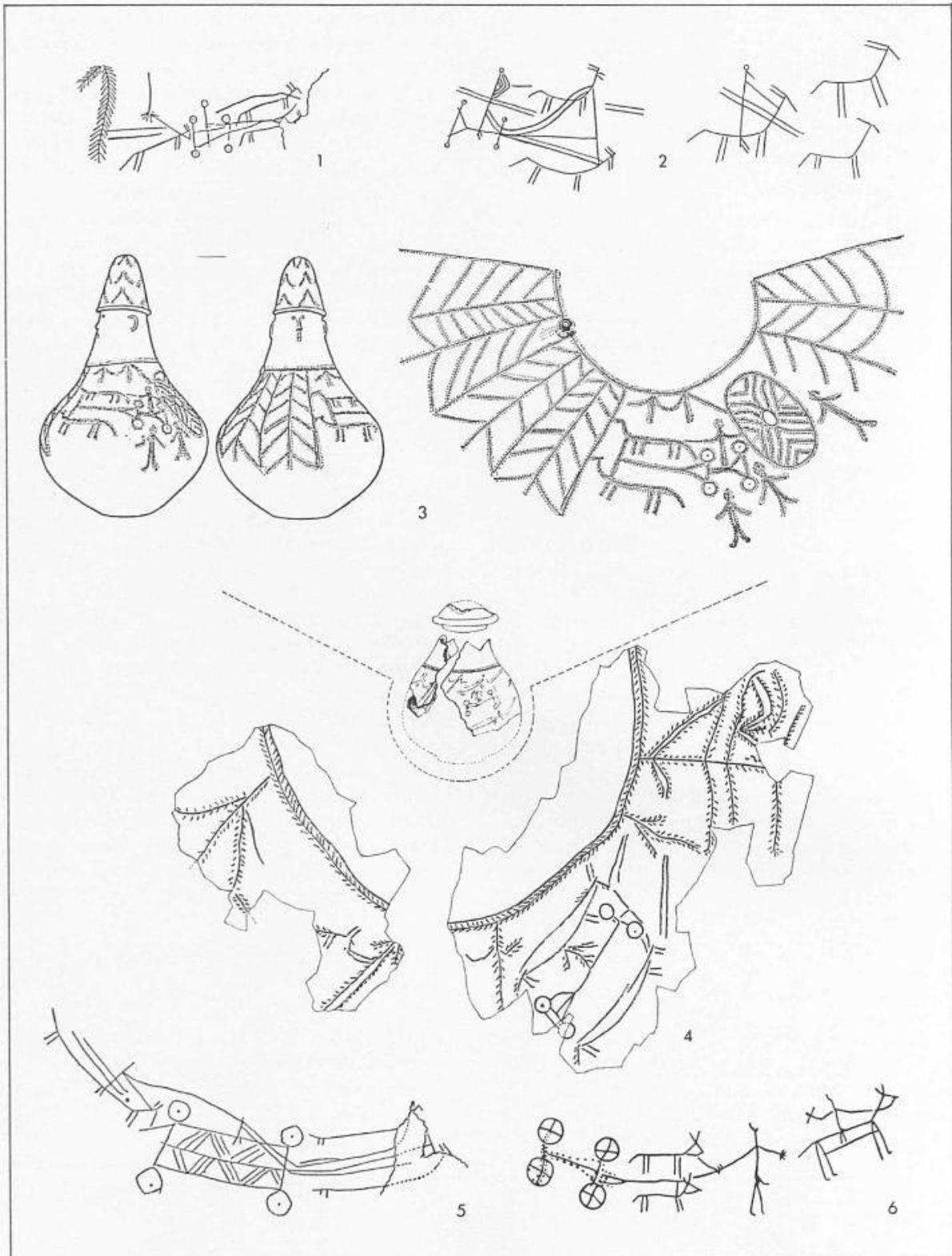


Fig. 145 Wagon depictions on Pomeranian Face-urns: 1 Lindebuden, 2 Witankowo, 3 Grabowo, 4 Bukówiec, 5 Elganowo, 6 Darżlubie (1.3.6 after La Baume 1963; 2 after La Baume 1924; 4 after Stanisław 1980; 5 after La Baume 1937). – Not to scale.

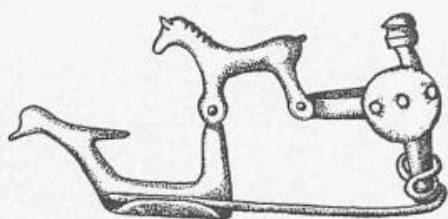


Fig. 146 Magdalenska gora, Slovenia: bronze fibula (after Müller-Karpe 1962b). – Scale 1:1.

wagon-graves and wagon fittings are completely lacking, only representations of two-wheeled chariots are known. In Italy, representations of vehicles of the 7th and 6th centuries BC are, apart from Magna Graecia, chiefly restricted to Etruria and Latium. The representations almost always depict two-wheeled chariots. Only three examples of four-wheeled wagons are known: on a cinerary urn from Vulci (Fig. 147), on a cippus relief probably from Chiusi (Woytowitsch 1978, no. 255) and on a wooden throne from Verucchio 'sotta la Rocca Malatestiana', grave 89 (Fig. 148).

In France, vehicle representations of the Hallstatt period have not been found; instead, four examples are known from the end of the Urnfield period. The representation from Moras-en-Valloire, and probably also that on a sherd from Saou, 'Le Pas-de-l'Estang', shows a two-wheeled vehicle (Nicolas and Martin 1972, 37, fig. 4; Combiér 1985, 403, fig. 20). Further to the west in Lansargues (Nicolas and Martin 1972, 39, fig. 7, 3) and Sublaines (Fig. 149), four-wheeled wagons were depicted.

The map on Fig. 141 shows a clear division between a zone in which two-wheeled chariots were depicted and a zone in which instead four-wheeled wagons were represented. While on the southern fringe of the Alps both types of vehicles are attested, north of the Alps the depictions are almost exclusively of four-wheeled wagons. The depiction of a chariot on a sherd from Rabensburg

(Fig. 150), however, is exceptional and could embody southern influence. The Italian four-wheeled wagons deserve particular attention, owing to their rarity and to the possibility that they could represent Central European influence or remnants of local Urnfield traditions. But before addressing these questions, we must first discuss the two-wheeled Etruscan vehicles: the racing or battle chariot (*currus*), and the so-called *Sitzwagen* (*carpentum*).

It must be emphasised that two-wheeled vehicles were already known in the Bronze Age – alongside carts possibly also chariots. But the elaborate Early Iron Age chariots represent something new and clearly played a far more important rôle than the two-wheeled vehicles of the Bronze Age. Our knowledge of the early chariot (*currus*) is admittedly hampered by the very small number of vehicle depictions before the 6th century BC and by the poor standard of preservation of many Central Italian grave finds. Nevertheless the available evidence points to the existence of a certain type of chariot in Central Italy, in the early and middle Orientalizing periods (late 8th to mid 7th century). The vehicle in question is also known later in North Italy from Situla art and from the Sesto-Calende chariot graves. On the situlae, the chariot box is represented with an arched railing with involuted terminals; the front of the box and the draught pole are linked by a short strut (Fig. 151, 1). Fragments of such railings with spiral terminals are among the finds from both of the Sesto-Calende chariot graves (Pl. 135; Woytowitsch 1978, pl. 19, 109b.c).

Similar spiral terminals of the later 8th and earlier 7th centuries are known from a large number of chariots in Etruria and Latium vetus (Galeotti 1988, 100), and contemporary depictions on ivory boxes from the 'Tomba Regolini-Galassi', Cerveteri (Fig. 151, 3) and the 'Tomba della Pania', Chiusi (Fig. 151, 2) seem to show the same type of vehicle. This type of chariot construction was already recognised in Italy by H. Nachod (1909: 'ägyptisch-griechischer Typ') and in Greece by E. von Mercklin (1909: 'ägyptischer Typ'). Some bronze models from Olympia, probably dating to the 8th century BC,

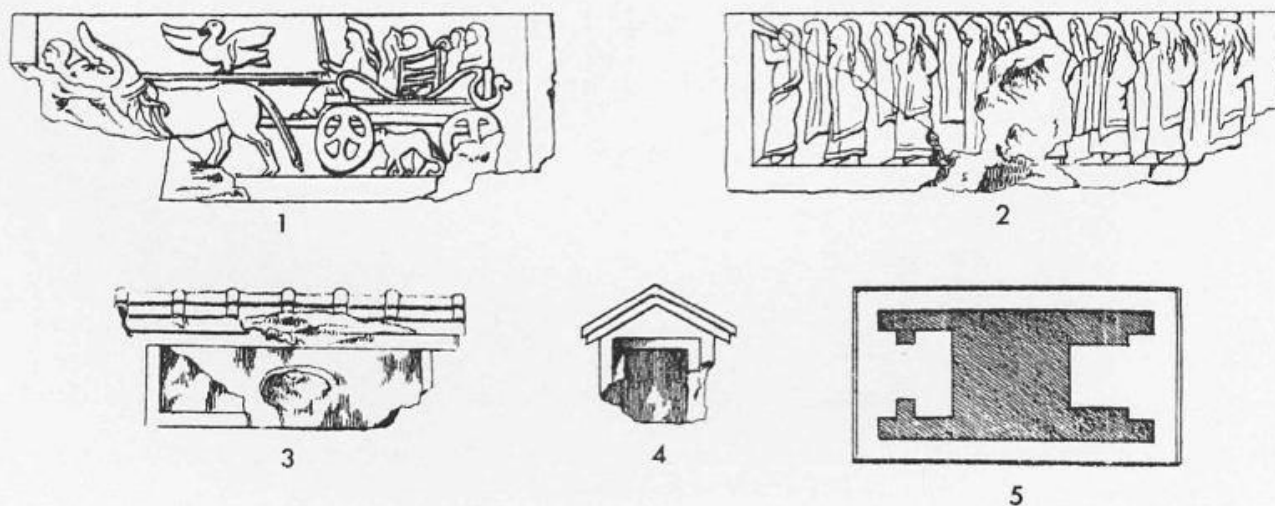


Fig. 147 Cinerary urn from Vulci (after Höckmann 1982).

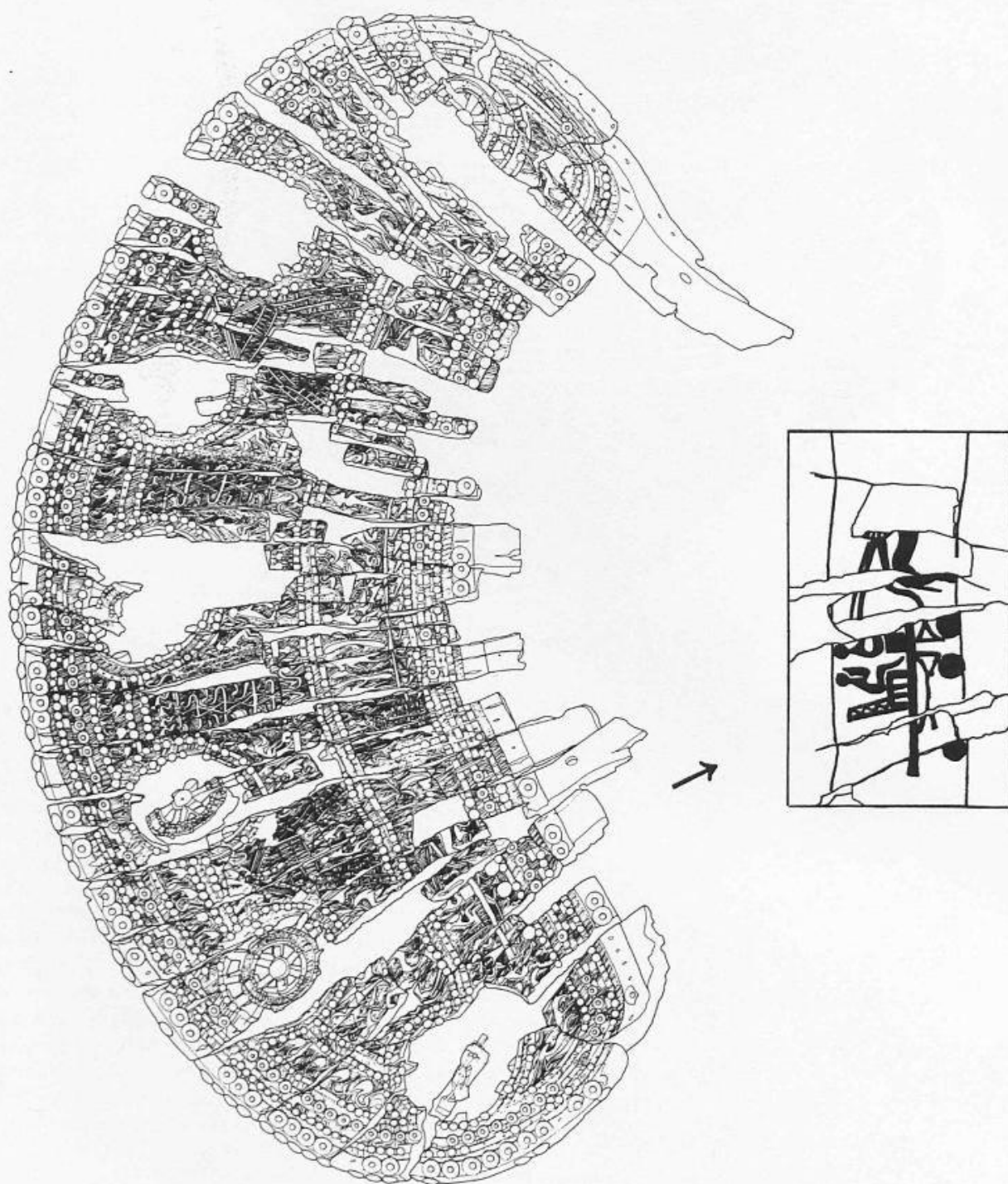


Fig. 148 Verucchio, 'sotto la Rocca Malatestiana', grave 89: part of a wooden throne with carved decoration (after Gentili 1987).



Fig. 149 Sublaines, dép. Indre-et-Loire: pottery vessel with wagon depiction (after Cordier 1975).



Fig. 150 Rabensburg, lower Austria: vehicle depicted on a sherd from a conical-necked vessel (after Dobiat 1982).

clearly illustrate the same construction (Fig. 152; the railings of these chariots lack involuted terminals; see also a new article by W.-D. Heilmeyer 1990). J. H. Crouwel recently argued convincingly that the Greek vehicles of this type derived from the Mycenaean 'Rail Chariot' (1981, 72-4). As Crouwel noted, comparable chariots are not known during the Geometric period in Egypt or the Near East. Therefore the origins of our Italian 'Rail Chariots' can only be sought in the Greek world. The 'Rail Chariot' must necessarily have been transmitted to Italy before the inception of the so-called 'High-front Chariot', which was current in Greece from the start of the 7th century, then appearing and becoming predominant in Central Italy in the second half of the same century. It need not surprise us that the 'Rail Chariot' was still being depicted in Situla art in the 6th and 5th centuries, considering the conservatism of this art form, also expressed for example in out-dated costumes (Bonfante 1981, 15ff.).

Whereas the battle chariot (*currus*) known from Italian graves and depictions of the late 8th to mid 7th century seems to have been derived from Greek (or possibly East Mediterranean) prototypes, a different origin must be sought for the other class of two-wheeled vehicle known from this period: the *Sitzwagen* or *carpentum*. In fact, these lack parallels in other Mediterranean cultures and can be

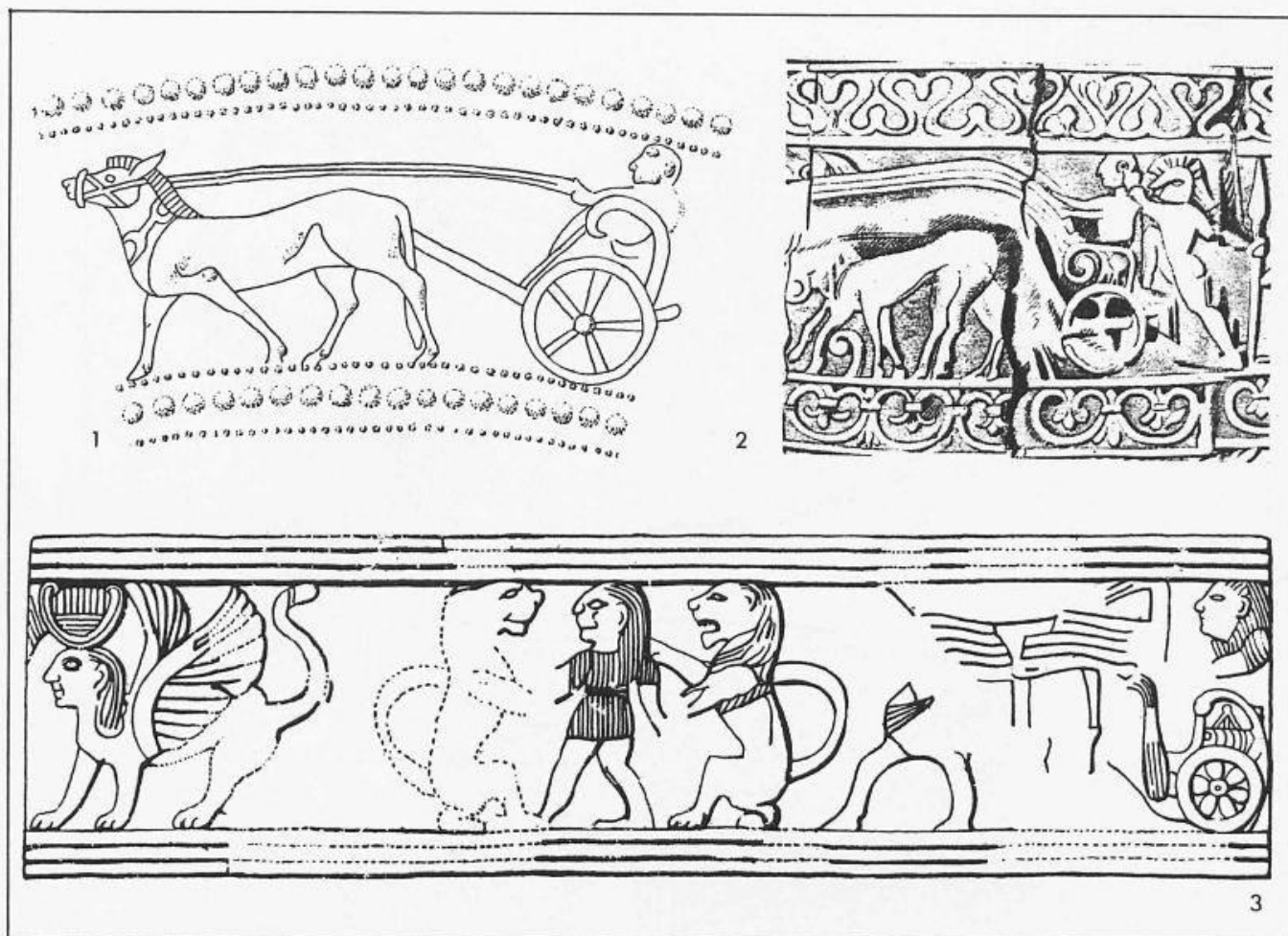


Fig. 151 Italian vehicle representations: 1 Este, Benvenuti, grave 126, bronze situla; 2 Chiusi, Tomba della Pania, ivory box; 3 Cerveteri, Tomba Regolini-Galassi, ivory box (1 after Lucke and Frey 1962; 2 after Nachod 1909; 3 after Pareti 1947).

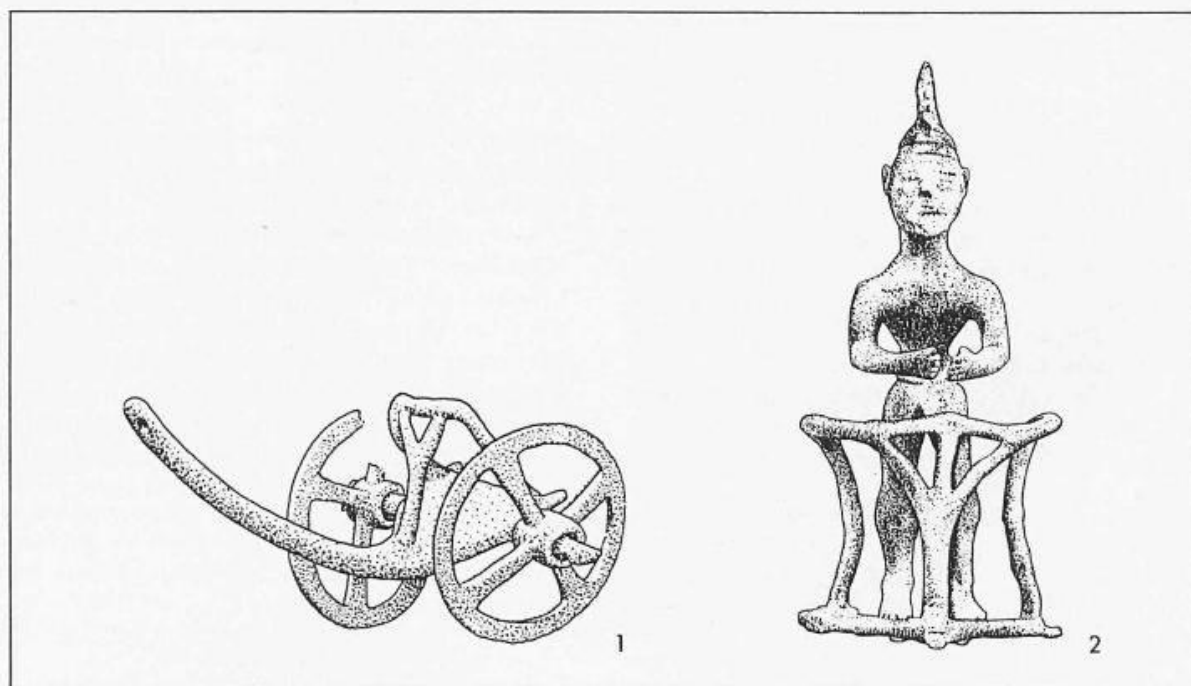


Fig. 152 Olympia, bronze models of chariots (after Crouwel 1981).

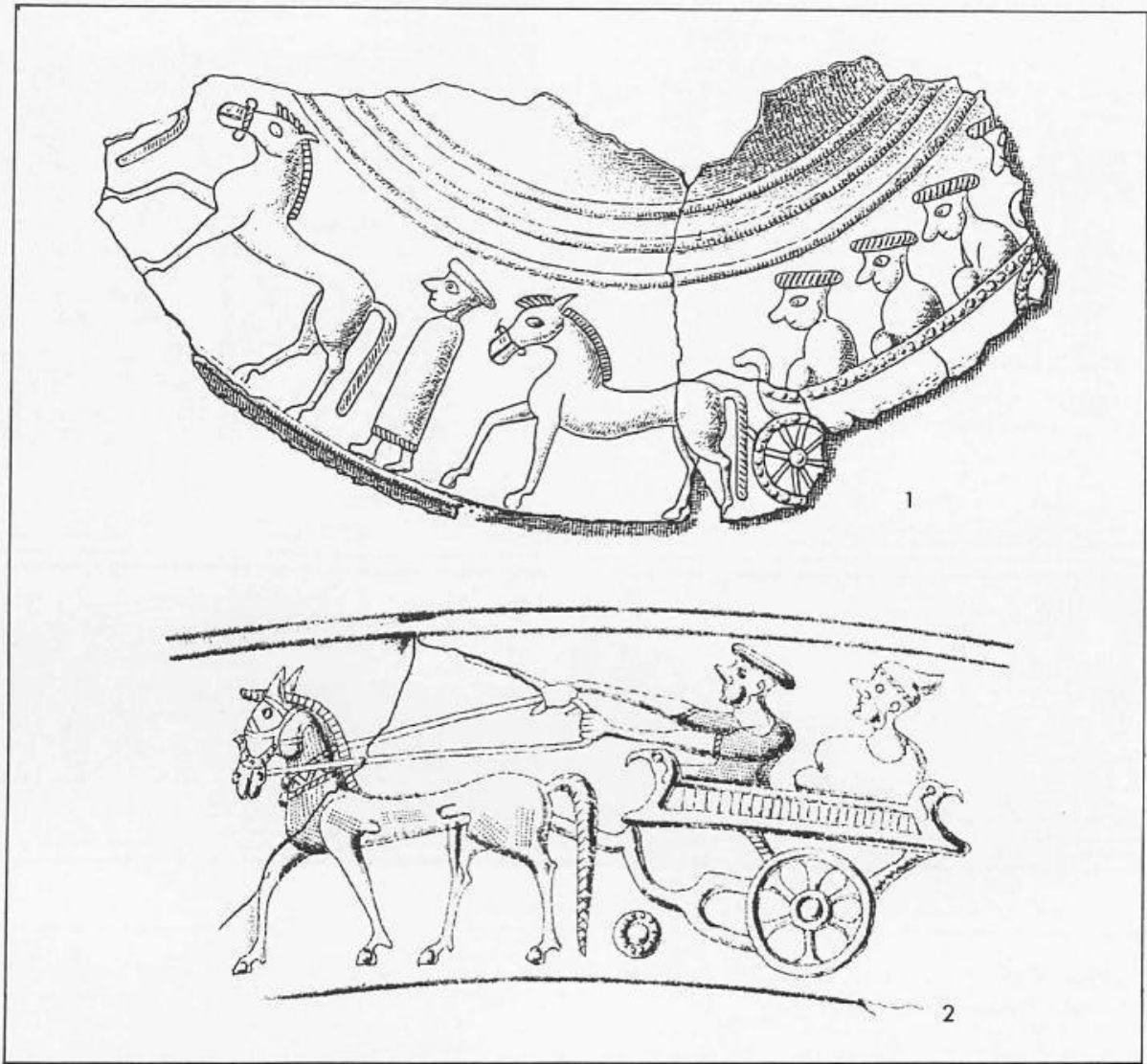


Fig. 153 1 Moritzing 'Vase' showing a four-wheeled vehicle; 2 Vače situla with a two-wheeled 'Sitzwagen' (after Lucke and Frey 1962).

regarded as a local, perhaps Central Italian vehicle type.²⁵

It is instructive to compare the wheeled vehicles depicted on Situla art: here the curious four-wheeled wagons and two-wheeled *Sitzwagen* are distinguished from the chariots by always being adorned with ornithomorphic or zoomorphic protomes²⁶ (Fig. 153, 1–2). The antithetic arrangement of the ornithomorphic protomes is reminiscent of Central European finds of the Urnfield period and particularly the so-called 'Vogelbarke' representations (e.g. Fig. 120). Thus, in contrast to the intrusive

chariot, the four-wheeled wagons and *Sitzwagen* still seem to bear the mark of old traditions concerning the ceremonial wagon.

The two graves in Etruria with four-wheeled wagons (Cerveteri, 'Tomba Regolini-Galassi' and Veii, Monte Michele, grave 5: Woytowitsch 1978, no. 31; Boitani 1983) and the depictions of wagons from Vulci (Fig. 147), Verucchio (Fig. 148) and Chiusi (Woytowitsch 1978, no. 255) could be interpreted similarly. According to our discussion of the evidence (see above, Ch. 12.3) the ceremonial vehicle *par excellence* in Central Italy was the

²⁵ Compare the similar 'Sitzwagen' representations on the Vače situla (Lucke and Frey 1962, pl. 73) and on a temple fresco from Murlo, Poggio Civitate (Kossack 1970, 162, fig. 15, b). For a discussion of the *Sitzwagen*, and its use by women, see Galeotti 1988; Bartoloni and Grottanelli 1989. These authors distinguish the chariot (*currus*) from the *Sitzwagen* (*carpentum*); although both types of vehicles have two wheels, certain metallic fittings distinguish the vehicles from male (*currus*) and female graves (*carpentum*). An important confirmation for this distinction was brought to light in a chamber-grave from Barbarano Romano: the *currus* and *carpentum* found in the *dromos* correspond to a double burial (male and female) in the grave chamber. See Caruso 1986, 129ff.; fig. 5.

²⁶ Apart from the examples illustrated here from Moritzing and Vače we should mention the following representations of four-wheeled (Mechel/Meclo: Lucke and Frey 1962, pls 27, 9i; 28, 11), and two-wheeled vehicles (Sanzeno: *ibid.* pl. 67; probably also Mechel/Meclo: pl. 27, 8e).

two-wheeled chariot (*currus*) adopted from Greek and East Mediterranean models. It does not seem possible that the use of the four-wheeled wagon could have been derived from the same source. All around the Mediterranean the chariot was predominant, as we can tell from Greek, Phoenician and Egyptian depictions and by the chariot-graves from Thessaly, Phrygia, Cyprus and Spain²⁷ (see above, Ch. 12.3–4). Considering that influence from the Hallstatt culture was negligible in 7th century Etruria, these four-wheeled wagons presumably indicate older cultural traditions. This constitutes an important indication that four-wheeled ceremonial wagons could have been known and used in the Villanovan culture, suggesting links between Urnfield Central Europe and Central Italy.²⁸

12.6 WAGON FINDS FROM SETTLEMENTS

A short treatment of wagon fittings from settlements is inserted here for completeness, as an additional source of information on Hallstatt wagons.

The author was only able to find wheel fittings from four settlement sites of the Hallstatt period but they are doubtless far more common. Three of the four settlements were rich hillforts – emphasising that the use of ceremonial wagons was chiefly restricted to a high social class. The excavations of R. Schweitzer on the Britzgyberg brought to light two iron nails of type C, with long rectangular heads, one of which is illustrated on Fig. 154, 2. One of the nails is fully preserved and the tip was bent over, showing the height of the felloe (ca. 66–7 mm).²⁹ Another nail was found in a Ha D context on the Hellbrunnerberg (Fig. 154, 1): it is of type E and the shank is bent 64 mm from the nail head, showing a felloe height of about 60 mm.³⁰

A slightly richer collection of fittings comes from the Heuneburg, published by S. Sievers (1984). Among the nails, her no. 2058 seems to be of type C, and no. 2055 could be of type E (Sievers 1984, 215–6; pls 196, 2055; 197, 2058). Both the pieces were stratified, belonging to Heuneburg period I. The excavations also produced fragments from two or three iron tyres. Number 2089 is 29 mm wide and clearly belongs to type VII (ibid. 1984, 217; pl. 200, 2089). Number 2082 is 26 mm wide with a thin

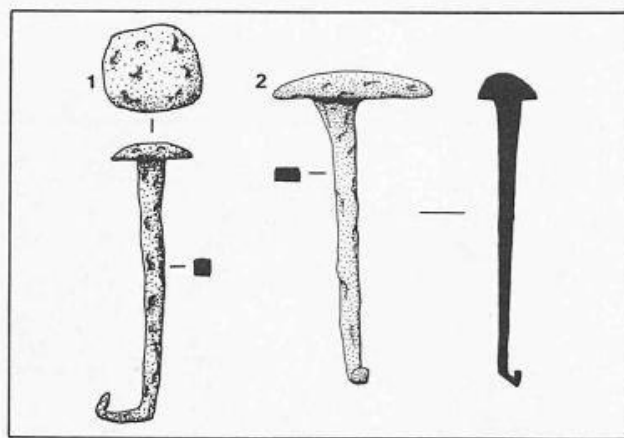


Fig. 154 Iron tyre nails from the settlements on the Hellbrunnerberg (1) and Britzgyberg (2). – Scale 1:2.

flat cross-section and two nail holes spaced about 200 mm apart: it could perhaps be related to type VI (ibid. 1984, 217; pl. 199, 2082). Another fragment could also come from a tyre (ibid. 1984, 214; pl. 192, 2010). Number 2082 was dated to Heuneburg period IIIa, and 2089 to period I.

The only other wagon fitting found in a settlement context is a nave-cap from Blatec, north Moravia.³¹ The nave-cap was found in 1932 in a brickworks at Blatec-‘Kocanda’, in a settlement pit, associated with a fragmentary iron band, a large decorated pottery sherd and two iron ingots³² (Fig. 155). The nave-cap (Fig. 155, 4) has a narrow rim reaching over the nave-head and is bent inwards to line the axle-channel. The rest of the nave could originally have been fitted with iron sheet. However, as this piece came from a settlement context, it could have come from a type of vehicle different from those found in wagon-graves. If so, the vehicle may have been more simply built, without the rich metal fittings and decoration which are typical for ceremonial wagons. Nevertheless we should note that the nave-cap shows certain similarities to those on type Repperndorf naves. I am grateful to V. Dohnal for the information that the burnished decoration on the neck of the sherd indicates a date in Ha D (Dohnal cited parallels from the settlement of Medlov, okr. Olomouc).

²⁷ The strange four-wheeled conveyance on an Attic Geometric vase is an exception, but surely cannot be compared with the Central European ceremonial wagons (Ahlberg 1971, fig. 53b).

²⁸ A question which is certainly important for this problem is whether the four-wheeled wagon on the cinerary urn from Vulci (Fig. 147) was decorated with ornithomorphic protomes; sadly the urn is lost and the only surviving drawing does not justify a clear answer.

²⁹ The two nails have not been published before and are located in the Musée Historique, Mulhouse.

³⁰ The nail has not been published before. It is housed in the Museum Carolino-Augustum, Salzburg, bearing the inventory number 238/76. The context was given as ‘Schnitt 4, Abfallhalde 1’.

³¹ A nail from Smolenice-Molpír, Slovakia, should perhaps be added to this list. It could be a type A tyre nail, but this cannot be regarded as certain. See Dušek and Dušek 1984, pl. 100, 3.

³² The two ingots weigh 1.16 and 1.34 kg. The pottery sherd comes from the shoulder and neck of a conical-necked vessel. The inside of the vessel is very abraded and has a buff to light brick red colour. The outside is graphited, with vertical burnished bands on the neck. On the shoulder are (from left to right) engraved hatched triangles, a small circular dimple, two shallow diagonal rills and a pointed nipple. The finds are in the Olomouc museum and bear the inventory numbers D. 1044 and 1493–1498. The finds have been mentioned by Skutil 1947, 141 and Nekvasil 1974, 301–2.

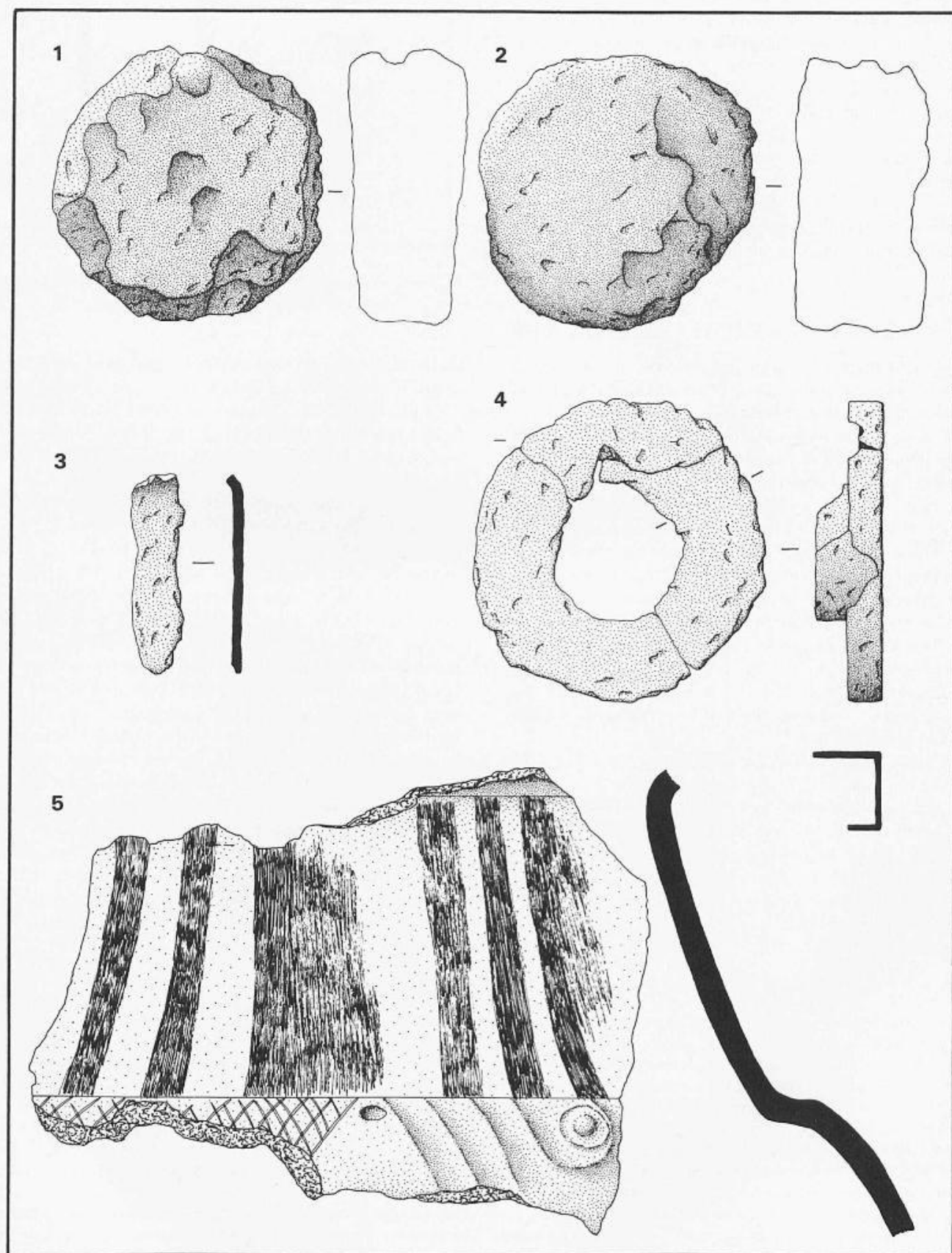


Fig. 155 Finds from the settlement pit of Blatec Kocanda, Moravia. — Scale 1:2.

Summary and Concluding Remarks on the Ceremonial Wagons of the Urnfield and Hallstatt Periods

The distribution of Hallstatt wagon-graves studied in this book forms a compact group of 228 graves spread over the area north of the Alps (Fig. 4). In Ch. 4–8 the wagon remains were examined in detail and classified into a number of typological groups. The typological classification resulted in the recognition of wagon types, defined as the recurrent use on wagons of particular metallic fittings (Figs 85–6). Typical metallic nave or box fittings or tyres survived from 174 wagons, allowing them to be accommodated in the typological classification. A further four vehicles from the very end of the Hallstatt period and the transition to the La Tène period were built almost completely without metallic fittings and 15 graves only contained linchpins, provided as *pars pro toto* of a complete wagon. Of the total 228 wagons only 35 were impossible to classify typologically – mainly because the wagon remnants had not survived. The typological classification is summarised in a table at the end of Ch. 8.

In Ch. 9 the wagons were examined from another aspect, in an attempt to understand their construction. It was possible to uncover a wealth of technical information which allowed us to conclude that the wagons were carefully made, functioning vehicles. It was found that almost all had four spoked wheels with iron tyres, and relatively small wagon-boxes with low sides. On a few examples metallic fittings indicated that the front axle was pivoted – rendering the wagons more manoeuvrable and easier to drive. The wagons were drawn by a pair of horses, the harnessing and yoke of which were often deposited in the graves.

The chronological study in Ch. 10 found that the wagon types and the individual types of fittings could be relatively precisely dated, and their use was often confined to a single phase (Fig. 107). This suggests that wagon construction underwent a continuous process of development, quickly incorporating any technical advances. In fact, in Ch. 11 we found that the Central European workshops often adopted techniques which clearly derived from Etruscan Italy. The special nature of the wagon-making workshop, with its skilled craftsmen, was discussed at the start of Ch. 11. Because the workshops must have been sedentary (with their requirement of carefully selected and seasoned wood), the distribution of wagon fittings and wagon types is instructive, and it was possible to draw a number of conclusions. In some cases (Wijchen, Uttendorf, the Býččí-skála cave) wagons may have been sent as gifts to communities far away from their place of production (see for example Wijchen: Figs 89; 116). Wagon type 7 was particularly interesting, being

very characteristic of the north-west Alpine ‘princely graves’ (Fig. 117).

Although this work primarily concerns wagons and wagon-graves of the Hallstatt period, the scope of the study was extended to include a range of other sources of information. The reason for this lies in the one-sided nature of the evidence from Hallstatt wagon-graves, which rules out an understanding of wagons by an examination of these data in isolation. Thus the wagon-graves of the Hallstatt culture are characterised by a certain uniformity in their construction and grave goods. The burials were generally furnished with recognisable sets of goods which, while varying regionally and from phase to phase and offering insights into the character of the deceased’s social position, gave little information about the rôle of the wagon itself. Likewise the wagon construction and metallic fittings offered few clues to its use before the burial. We were able to conclude that the wagons were carefully made, functioning vehicles but, owing to their solid construction and small wagon-box, designed neither for speed nor heavy transport. The decoration of the wagons was often very elaborate, demanding a considerable amount of work by skilled craftsmen. Of course this underlined the importance and prestigious rôle of the wagons, but they lack constructional attributes giving unambiguous indications of their original function. Consequently, the results of our discussion of the Hallstatt wagons in Ch. 11 were necessarily chiefly restricted to a demonstration of wagons as objects of prestige and social status.

In fact it is well-known that wagon-graves almost always stand out in a cemetery, either owing to their rich grave goods or their elaborate construction (e.g. wooden grave chambers, large tumuli etc.). The provision of a wagon in a grave was part of a special burial rite which was only accorded to a particular social group. Because the grave goods indicate both male and female burials, we can probably interpret the deceased as members of a certain echelon in society and presumably, according to the elaborate grave construction and splendid goods, of an elevated social rank. The Italian vehicle-graves are likewise characterised by rich grave furnishings (see for example Stary 1980, 9; 11–12).

But it is incorrect to regard wagons simply as valuable, prestigious objects, equivalent to any other luxurious possession – even though we were able to conclude that wagon burial was confined to an elevated social group. Our analysis of other sources of information from the Urnfield and Hallstatt periods (Ch. 12, chiefly: graves of

the Hart a. d. Alz group; models; ritual depositions and hoards; pictorial representations) enabled us to uncover an additional use which, over wide areas of Europe, was traditionally assigned to the four-wheeled wagon: as an element in cult practices and processions.

When one compares the distributions of vehicle-graves (Fig. 134), models (Fig. 123) and representations (Fig. 141) it is clear that the ceremonial wagon could play an important rôle in areas where wagon burial was not practised: for example Pomerania, Slovenia and the Balkans. Yoke fittings and paired sets of harness in graves (Fig. 135) and hoards, indicating elaborately ornamented horse teams, furnish evidence for ceremonial wagons in further areas. Obviously the wagon was used in wide areas of Europe north of the Alps, even though it was provided in graves only in a certain cultural zone.

Numerous indicators point to a use of wagons in cult, not only in the Urnfield culture, but also continuing alongside and later than the Hallstatt culture in Italy, the Balkans and Northern Europe. The evidence has already been discussed above but we may recall, for example, the North European hoard depositions (Figs 128–131), the Delphi (Fig. 124, 1) and Crannon cult wagons (Fig. 127), and the strange wagons depicted on Situla art (Fig. 153, 1). We should also mention later survivals of cult wagons in Northern Europe observed by Tacitus¹ and documented by the wagons of Dejbjerg and related finds.² Whatever the functions of these vehicles (here called 'ceremonial wagons', owing to their use both in cult and prestigious contexts), their potent symbolism and social importance insured that they left a wealth of information in the archaeological record.

We should not forget the long history of wagon burial, reaching back to the Copper Age,³ and recurring in the Merovingian period.⁴ An impressive account of a wagon burial, of the Danish king Harald Hiltitanr (Harald Kampfzahn), is contained in the Song of the Battle of Bráavalla:

When King Haraldr fell in the great battle of Bráavalla, King Hringr ordered that his corpse be washed, ornamented and placed on his wagon, that a great tumulus should be consecrated and that the corpse together with the wagon and horse should be driven into the grave and the horse should be killed. Then he took his own saddle and presented it to

Haraldr's corpse, so that he could do as he wished, either drive or ride to Valhalla. All the heroes threw rings and weapons into the tumulus before it was closed. (Grimm 1850, 49–50)

The use of wagons often seems to have been linked with high status in prehistory – and later. The rôle of wagons as status symbols in Urnfield and Hallstatt graves is therefore not exceptional; the use of the four-wheeled wagon in cult practices, however, was a phenomenon special to this 800-year epoch.

The importance of wheeled vehicles in the classical world where, once again, they were often recognised as status symbols, should also be mentioned. In Rome, for example, driving vehicles in the city was restricted to the emperor and a few high officials such as praetors and city prefects⁵ and driving on the *cursus publicus* was only allowed for certain officials.⁶ Vehicles were already depicted on the sarcophagi of Etruscan officials – and the rank of the official can be recognised by his vehicle and 'sella' and by the accompanying lictors, 'cornicines' and scribes.⁷

The ceremonial vehicle depicted on Etruscan sarcophagi was certainly derived from the Etruscan war chariot (Höckmann 1982, 151–2). According to U. Höckmann it is likely that the privilege of vehicle driving in Etruria can be explained by the use of the chariot in battle in the 7th century BC (ibid. 1982, 155). If the Etruscan ceremonial vehicles, and perhaps therefore even the vehicle fittings, 'stimuli' and paired harness found in Central Italian graves (Fig. 133), are to be understood as emblems of a social class which originally drove chariots in battle, then Central European wagon burial must surely be interpreted differently: primarily because the four-wheeled wagons of the Urnfield and Hallstatt periods could never have played an effective rôle in warfare. Indeed, we have argued that the practice of ceremonial wagon-driving in Central Europe descended from other traditions, reaching back to the start of the Urnfield period. It is likely that the wagon had a rôle in cult associated with a certain social group, presumably of high social rank. Wheels and wagons very probably also had additional significance in Urnfield symbolism, which lent them a meaning as magical or cosmological emblems.

¹ Tacitus, *Germania* 10 and 40.

² See Jensen 1980, with further references.

³ Baden, Kugelamphoren, Walternienburg and Elbe-Havel cultures: e.g. Alsónémedi, Budakalász, Zdrojowska. See especially the distribution map in Piggott 1968, 303, fig. 18 and pp. 306–8; Banner 1956, 207; 222; Mansfeld 1984, 14–5. Ochre-grave cultures: e.g. Plačidol, north-east Bulgaria: Panayotov and Dergachov 1984, 107–9; see especially Häusler 1974; ibid. 1976.

⁴ E.g. Zeuzleben, Erfurt-Gispersleben, Krefeld-Gellep etc. See Müller-Wille 1985.

⁵ Alföldi 1934, 106–11; the vehicles were often richly ornamented: ibid. 108, notes 2–3. Sometimes, like the imperial chariot, they were provided with a throne.

⁶ It was probably for this reason that vehicles were often depicted on Roman sarcophagi as part of an official's paraphernalia (Weber 1978; Gabelmann 1982); a wheeled vehicle could also sometimes be provided in Roman graves (e.g. Frenz, Kreis Düren: Lehner 1923; Pannonia: Alföldi 1935, 269–70).

⁷ Weber 1978, 97–102. The earliest representation of the wheeled vehicle in official regalia dates to the 5th century BC: Höckmann 1982, 152–3.

Catalogue of the Wagon-Graves of the Hallstatt Period

1 HOLLAND

1 Wijchen

(Prov. Gelderland, Holland)

References: Abeleven and Bijleveld 1897, 12; De Laet 1974, 402.

Description: These finds were discovered in 1897 in an urn, buried 1 m deep in sandy ground (*zandgrond*). The urn is lost, as are any remains of cremated bones. Many of the finds were damaged by fire, presumably from the cremation pyre.

Finds:

- 1) Large-headed cast bronze linchpin (no. 1). The linchpin is trident-shaped with a horizontal crossbar at the top. Four rings are cast with the linchpin – at the ends of the three prongs and at the base of the middle prong. Two of the rings bear pendent bronze rings which are round in cross-section. The prongs of the trident, the crossbar and the shaft of the linchpin are all square or rectangular in cross-section. The end of the shaft is perforated. The outer sides of the two external prongs are decorated with groups of engraved diagonal lines. At the join of the three trident prongs the linchpin is thickened; the rear side of the thickening is cut away, perhaps to make the linchpin fit neatly on its axle-cap. The ends of the trident are terminated by anthropomorphic or zoomorphic heads. The heads have large pointed ears, prominent noses and deep eyes. They have complex hairstyles, each with a long plait with engraved groups of diagonal lines. The top of the head seems to have a central parting marked by a heavy rib, with the hair falling away to either side. The rear side of the head is demarcated from the plait, so that the hairstyle forms a cap shape. (Pl. 1, 1)
- 2) Large-headed cast bronze linchpin (no. 2). The linchpin is trident-shaped with a horizontal crossbar at the top. Four rings are cast with the linchpin, as on linchpin no. 1. One of the rings bears pendent bronze rings which are round in cross-section. The prongs of the trident, the crossbar and the shaft of the linchpin are all square or rectangular in cross-section. The end of the shaft is perforated. The join of the three trident prongs is not thickened, but the rear side of the base of the trident is cut away, perhaps to make the linchpin fit neatly on its axle-cap. The ends of the trident prongs are terminated by zoomorphic heads. The heads have button-shaped ears and noses, eyes marked by circular depressions and mouths marked by three crossed engraved lines. Each head has a long plait which is parted in the centre. Only two of the plaits have the groups of engraved diagonal lines seen on linchpin no. 1. (Pl. 1, 2)
- 3) Large-headed cast bronze linchpin (no. 3). The linchpin is trident-shaped with a horizontal crossbar at the top. Four rings are cast with the linchpin, as on linchpin nos 1 and 2. Two of the rings bear pendent bronze rings which are round in cross-section. The prongs of the trident and the crossbar are rectangular in cross-section; in contrast the shaft has a heavy round cross-section. The end of the shaft is perforated. The join of the trident prongs is thickened, but unlike linchpins nos 1 and 2 the rear side is not cut away. The ends of the trident prongs are terminated by zoomorphic heads. The heads have button-shaped ears and noses, eyes marked by circular depressions, and mouths marked by three long crossed engraved lines. On each side of the nose is a pair of engraved lines. Each head has a long plait which is parted in the middle. (Pl. 2)
- 4) Large-headed cast bronze linchpin (no. 4). The linchpin is trident-shaped with a horizontal crossbar at the top. Four rings are cast with the linchpin, as on linchpins nos 1–3. Two of the rings bear pendent bronze rings which are round in cross-section. A fragment of another ring is affixed by corrosion to the central prong of the linchpin. The prongs of the trident and the crossbar are rectangular in cross-section; the shaft is heavier and has a rounded squarish cross-section. The end of the shaft is perforated. The join of the trident prongs is thickened and has casting faults. The rear side of the thickening is cut away. The ends of the trident prongs are terminated by zoomorphic heads. The heads have button-shaped ears and noses, eyes marked by circular depressions and mouths marked by three crossed engraved lines. Each head has a long plait which is parted in the middle. (Pl. 3)
- 5) Four cast bronze axle-caps of type Wijchen. The axle-caps are made with a broad circular flange 97 mm in diameter and a slightly conical cylinder for the axle. The internal diameter of the cylinder measures 43–46 mm at the flange and 40–41 mm at the end. The end of the cylinder is closed, and decorated on its outer side by nine stamped dots-and-circles. The cylinders of the caps each have two roughly square holes for the linchpins, measuring about 13–16 × 14–16 mm. The sides of the holes show signs of wear. On the rear side of the flange of one cap (Pl. 4, 4) are remains of iron sheet, presumably from a nave-cap which was flat and measured slightly more than 97 mm in diameter. (Pl. 4)
- 6) Two fragments of a cast bronze band with openwork decoration, broken and folded together. The band was 57 mm wide, composed of sides 12 mm wide and an openwork decorated central zone 33 mm wide. The decoration comprises openwork triangles and circles. The ends of the band tapered to a blunt point. Short blunt tongues projected from the sides of the band. (Pl. 5, 1)
- 7) Hollow cast bronze socket with a bulbous head, and remains of a second socket. The socket is 59.5 mm long and has a circular hole at the top. (Pl. 5, 2)
- 8) Square cast bronze base, and remains of a second square base. The objects probably acted as bases for the two

sockets described above. The bases measured 49.5 × 49.5 mm and rose up to a circular aperture ca. 25 mm in diameter. (Pl. 5, 4)

- 9) Three fragments of cast bronze plaques with openwork decoration. The plaques were composed of hollow hemispherical cups linked together. On one example two of the cups were perforated and held a 'U'-shaped clip on which was looped a bronze ring (Pl. 5, 3). (Pl. 5, 3.10)
- 10) Four fragments of similar plaques with larger cups. (Pl. 5, 11)
- 11) 10 bronze rings each with a pair of nails. Of three sizes: 33 mm in diameter (1), 30 mm in diameter (1) and 25.5 mm in diameter (8). (Pl. 5, 5-7)
- 12) Two bronze nails with hollow domed heads. (Pl. 5, 8)
- 13) Fragmentary hollow lens-shaped iron knob, to the top of which two linked bronze rings were affixed by corrosion. The finds include another pair of linked bronze rings of the same size. (Pl. 5, 9)
- 14) Two cast bronze horse bits with links bearing false twisted decoration. The bits each have a pair of rein rings. The rings of the horse bits, as well as the rein rings, are much worn. (Pl. 5, 22.23)
- 15) Six cast bronze ring-footed rein knobs. Of two sizes: 23 mm in diameter (5) and 29.5 mm in diameter (1). (Pl. 5, 13.14)
- 16) Three fragments of bronze sheet 'yoke-bands'. There is a raised rib on each side of the band. (Pl. 5, 19-21)
- 17) Three bronze rings with square cross-section, of two sizes: 42.5 mm in diameter (1) and 46.5 mm in diameter (2). (Pl. 5, 17.18)
- 18) 10 bronze rings with round cross-section, of two sizes: 25 mm in diameter (7) and 31 mm in diameter (3). (Pl. 5, 15.16)
- 19) Two linked bronze rings with square cross-section, ca. 30 mm in diameter, and a third single bronze ring of the same size. (Pl. 5, 12)
- 20) Two large circular cast bronze pendants. These are made from two rings with square cross-sections (diameters ca. 70-75 mm and 47-48 mm). The outer ring has a 'D'-shaped suspension loop. (Pl. 6A, 9.10)
- 21) Cast bronze socketed axe, badly damaged by fire. The axe has emphasised shoulders and on the socket are ribs imitating the appearance of a flanged axe. (Pl. 6A, 8)
- 22) Two fragments of an iron sword, folded double or three times and broken into fragments. The cross-section seems to show a central rib. (Pl. 6A, 11)
- 23) Fragments from a bronze sheet ribbed bucket (*Rippenziste*) with movable handles. The handle attachments are of Stjernquist's type AH3 (Pl. 6A, 12.13) and the handle (Pl. 6A, 7) with knobbed ends is of her type E5 (Stjernquist 1967). The ribs on the body of the bucket are tripartite, with a broad rib bounded by a pair of narrower ribs (Pl. 6A, 1.2). The seam of the bronze sheet was joined by flat rivets (Pl. 6A, 1). The rim of the bucket was curled outwards around a wire of unknown metal, about 2 mm in diameter (Pl. 6A, 1). Between the tripartite ribs was point-boss decoration (Pl. 6A, 2), apparently sometimes arranged with diagonal ribs (Pl. 6A, 6). It is not certain whether three further fragments of bronze sheet belonged to the bucket (Pl. 6A, 3-5). One fragment had linear ribbed decoration (Pl. 6A, 5), and another seems to have been mended with bronze wire (Pl. 6A, 3). (Pl. 6A, 1-7.12-13)

Museum: Rijksmuseum G. M. Kam, Museum van Romeins Nijmegen, Nijmegen.

2 FRANCE

2A Apremont, 'tumulus de la Motte', grave 1

(c. Gray, ar. Vesoul, dép. Haute-Saône)

References: De Mortillet 1879, 674; Castan 1879, 380-383; Perron 1880a, 337-359; Perron 1880b, 820-821; Bertrand 1881, 340-346; Déchelette 1913, 655-656.832.869; Drack 1958a, 64; Joffroy 1958, 32-44; Millotte 1963, 259; Mohen et al. 1987.

Description: The 'tumulus de la Motte' was excavated by E. Perron in 1879 and measured ca. 70 m in diameter and 4 m in height. Perron dug a trench 2 m wide from the perimeter towards the middle of the tumulus, where he found the central grave and extended his excavation to a square of 4.5 × 4.5 m. The grave was housed in a wooden chamber measuring 3.2 × 2.8 m, orientated NE-SW, built on the old ground surface (or perhaps on a neolithic settlement layer), without a stone protection. The finds had been squashed to a layer 120-150 mm thick (for plan see Fig. 156).

No bones from the inhumation had survived but its position, orientated (head)NE-SW(feet), was indicated by the grave goods. The head was marked by a gold neck-ring (Joffroy 1958, pl. 1 and 37, fig. 7, 2.3). Also by the head were four amber beads, 18 mm in diameter (*ibid.* 37, fig. 7, 4). Near the neck were five small gold trinkets (*ibid.* 37, fig. 7, 5-7). At the waist, or by the left forearm, were three rings of bone or ivory, 15 mm in diameter (*ibid.* 37, fig. 7, 8). To the right of the inhumation was a fragmentary profiled ivory rod (*ibid.* 37, fig. 7, 9). Further to the right of the inhumation was a bronze cauldron, ca. 800 mm in diameter, with two large iron rings; the cauldron contained a small gold cup, 140 mm in diameter (*ibid.* fig. 7, 10). To the left of the feet was a pile of burnt bones mixed with charcoal: the remains of a cremation burial. Among the burnt bones and charcoal was a rolled-up iron sword, ca. 830 mm long, with a flat iron hilt with two rivets, and a type of ricasso seemingly derived from the Carp's tongue swords (Perron 1880a, pl. 10, 1; Mohen et al. 1987, 91, figs 109-10).

In each corner of the grave chamber were the iron remains of a wheel from the four-wheeled wagon. The tyres were 35 mm wide, with a cross-section of type VII and a diameter of ca. 900 mm (Pl. 6B, 1). They were provided with nails with flat square heads of type E. The spokes were covered by iron tubes, 290 mm long and 40 mm in diameter, which were each decorated with three ring-shaped sleeves spaced 65 mm apart (Pl. 6B, 7). The naves (Pl. 6B, 6) were of type Cannstatt and were covered with ribbed iron sheet (see Perron 1880a, pl. 10, 19 - note that the ribbing on the nave sheathing from Apremont grave 2 is much finer than the ribbing on this nave; note also that Joffroy's reconstruction of the nave with only four spokes is certainly incorrect: Pl. 6B, 6). The axles were fitted with simple iron caps of type Wellenburg, 125 mm in diameter, which were provided with a small-headed linchpin (Pl. 6B, 4). There were also two smaller caps of the same shape for the draught pole axle, 66 mm in diameter (Pl. 6B, 3). The grave contained seven hollow hemispherical bosses, some on a flat square base (Pl. 6B, 5).

Also among the finds were some pieces of fine embossed iron sheet and several fragments of a sort of hollow iron half-cylinder, flat on one side and ribbed on the rounded side (Pl. 6B, 2). Many of the iron objects bore remains of textiles, preserved by the iron rust; these compose the largest collection of textiles of the Hallstatt period in France (Perron 1880a, pls 12-14).

Comments: In his description of this grave, Joffroy incorrectly included the finds housed in the museum of Besançon (Joffroy 1958, 41, fig. 8, 6.7.13). He also included an iron half-cylinder

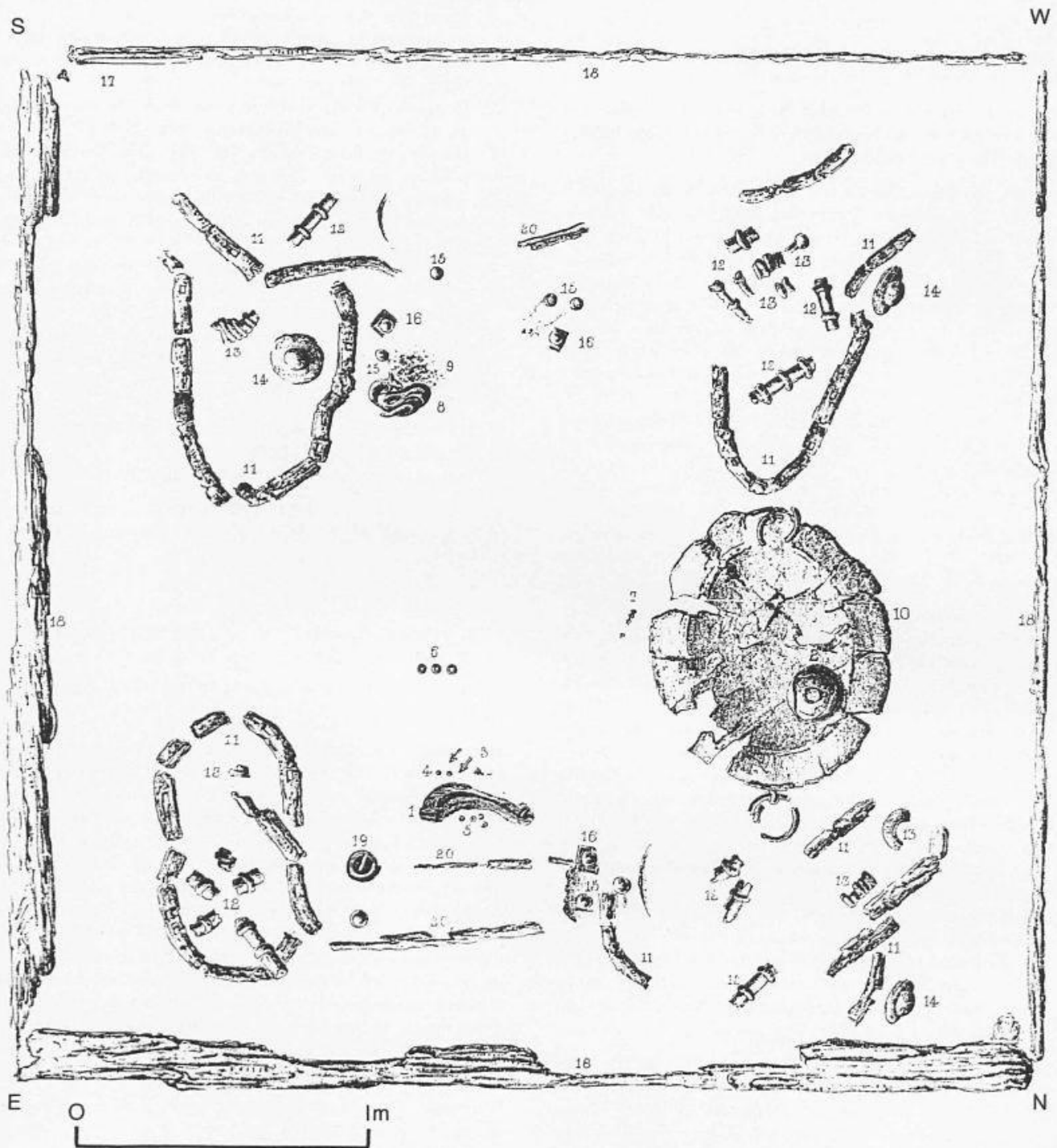


Fig. 156 Apremont, 'tumulus de la Motte', grave 1: plan of the grave chamber (after Perron 1880a).

which belongs to Sainte-Colombe 'La Butte' (ibid. 41, fig. 8, 14). The author was not able to study the finds from Apremont in the Musée des Antiquités Nationales, St. Germain-en-Laye.

Museum: Musée des Antiquités Nationales, St. Germain-en-Laye.

2B Apremont, 'tumulus de la Motte', grave 2

(c. Gray, ar. Vesoul, dép. Haute-Saône)

References: Perron 1880a; Piroutet 1913, 648; Drack 1958a, 64; Joffroy 1958, 32-44; Millotte 1963, 259; Joffroy 1969; Sievers 1982, no. 186; Pare, 1989b.

Description: In the archive of the Museum in Besançon (1887, registre V, 79) is a manuscript entitled 'Mémoire de M. Etienne Ménétrier cultivateur à Apremont'. The manuscript states that the finds from the 'Motte d'Apremont' in Besançon museum were bought on November 12th 1887 from E. Ménétrier, for 150Fr and came from a recent excavation. The manuscript then lists the finds, which comprise an iron dagger in a bronze scabbard with spherical chape (length 290 mm), three fragments of a lignite ring or bracelet and a series of iron fragments from a wagon.

Joffroy (1958, 40, note 2) thought that the Besançon finds came from E. Perron's 1879 excavations of the 'Motte d'Apremont', suggesting that they were given by Perron to A. Castan and thereby reached Besançon. This is contradicted by the above manuscript. On the contrary, the following facts imply that the Besançon finds came from a different excavation, and a different grave, from those in the Musée des Antiquités Nationales, Saint-Germain-en-Laye.

- 1) The Besançon wagon finds differ typologically from those in the Musée des Antiquités Nationales. Compare, for example, the nave-sheathings in the Besançon museum (Pl. 7, 1) with those in the Musée des Antiquités Nationales (Pl. 6B, 6; Perron 1880a, pl. 10, 19). Also compare (i) the large axle-caps in Besançon (Pl. 7, 4) and the Musée des Antiquités Nationales (Pl. 6B, 4); (ii) the small axle-caps in Besançon (Pl. 7, 7) and the Musée des Antiquités Nationales (Pl. 6B, 3); (iii) the spherical fittings on square bases in Besançon (Pl. 8A, 1) and the Musée des Antiquités Nationales (Pl. 6B, 5).
- 2) The Besançon finds are not included on Perron's excavation plan (Fig. 156).
- 3) The Besançon and Musée des Antiquités Nationales assemblages both contain a sword or dagger.
- 4) The Besançon manuscript of November 1887 states that the objects came from a recent excavation, whereas Perron's excavations had taken place eight years before the writing of the manuscript, in 1879.

Quite clearly a second grave was opened after Perron's excavations. This is confirmed by the gold neck-ring which was found in the 'Motte d'Apremont' in 1886 and sold to the Musée des Antiquités Nationales. The wagon, dagger and neck-ring obviously came from a second princely grave in the 'Motte d'Apremont', which was discovered in 1886 by local farmers.

Finds:

- 1) Fragments of iron tyres of type VII, ca. 36 mm wide. The nails have squarish heads of type E, measuring ca. 24 x 24 mm. (Pl. 7, 3)
- 2) About 43 fragments of ribbed iron nave fittings of type Cannstatt. From the fragments, it is possible to reconstruct almost completely the profile of the nave. The nave had

sockets for 12 spokes, measuring 33 mm in internal diameter, and an axle-channel 58 mm in diameter. (Pl. 7, 1)

- 3) One fragment of the cylindrical iron sheet cover of a spoke. The fragment has a hollow raised sleeve. (Pl. 7, 5)
- 4) Iron sheet fitting from the join between a spoke and the felloe (and three smaller fragments). The end of the spoke was housed in a short ribbed tube (internal diameter 33 mm). The felloe was fitted with a 'U'-shaped iron sheet band. (Pl. 7, 6)
- 5) Dome-shaped object of iron sheet. Probably the remains of an axle-cap of type Wellenburg. (Fig. 72, 10; Pl. 7, 4)
- 6) Iron fittings from the end of the pole axle. The axle had a profiled axle-cap. The pole axle itself was housed in a cylinder covered with finely ribbed iron sheet. The end of the axle had a cap with an axle-channel 26 mm in diameter. (Pl. 7, 7)
- 7) Numerous fragments of iron sheet, possibly from the wagon-box. Some of the fragments bear ribbed and embossed decoration. (Pls 7, 8-11; 8A, 2-9)
- 8) Hollow dome-shaped boss on a square base, made of iron sheet. The square base measured ca. 85 x 85 mm and had a spherical-headed iron nail at each corner. (Pl. 8A, 1)
- 9) Gold neck-ring, maximum diameter 203 mm. (Fig. 118)
- 10) Iron dagger in a bronze scabbard with spherical chape, length 364 mm. (Pl. 7, 2)
- 11) Three fragments of a lignite arm-ring or bracelet.

Museum: Musée des Beaux-Arts et d'Archéologie, Besançon. Gold neck-ring: Musée des Antiquités Nationales, St. Germain-en-Laye.

3 Blotzheim, 'Lisbühl'

(c. Huningue, ar. Mulhouse, dép. Haut-Rhin)

References: Faudel 1888; Naue 1905, 506-14; Ruhlmann 1927; Millotte 1963, 272.

Description: The 'Lisbühl' was a very large isolated tumulus, in 1884 measuring 70-75 m in diameter with a height of 3.5-4.0 m; it was apparently even larger in 1851 (5m high and 225 m in circumference, according to Ravenèz). The main excavation of this tumulus took place in 1884, but some damage was apparently already done by soldiers during the French revolution and the tumulus was re-excavated in 1925. The excavators of 1884 dug a trench orientated E-W, which was widened in the middle of the tumulus. They found several bronze nails with large spherical heads, two small bronze rings, an openwork bronze decorative plaque, three small rein-knobs, a nailed wheel-shaped object, a rod-shaped pendant, a double-drum fibula, an iron horse bit, three fragmentary 'omega-clips', some iron fragments from a wagon, some pottery sherds with fine decoration and a complete pottery bowl.

Comments: These finds must have come from more than one grave. It seems likely that the wagon, pottery and horse-gear came from one grave (Ha C2?), whereas the fibula and rod-shaped pendant came from secondary graves (Ha D).

The 'Lisbühl' was re-excavated in 1973/4, but only a few sherds remained from the central grave (see reports in *Gallia* 32, 1974, 369-71; 34, 1976, 382-4).

Finds:

- 1) Two fragments of iron felloe-clamps; one of the clamps preserves diagonal wood grain, indicating a Großebstadt felloe construction. (Pl. 8B, 1.2)

- 2) Two flat iron fragments, one with a nail. These fragments could come from felloe-clamps shaped like the examples from Marainville-sur-Madon (Fig. 66, 1). (Pl. 8B, 3.4)
- 3) Iron fragment, possibly from a nave-head ring. The internal surface of the fragment bears transverse wood grain. (Pl. 8B, 5)
- 4) Openwork cast bronze decorative plaque. Lost. (Pl. 8B, 10)
- 5) One iron horse bit. (Pl. 8B, 12)
- 6) Three fragmentary iron 'omega-clips', each with wood grain from an object 13-14 mm thick, probably a wooden cheek-piece. (Pl. 8B, 7-9)
- 7) Two large iron rings, ca. 60 mm in diameter. (Pl. 8B, 6.11)
- 8) Two bronze rings with profiled cross-section. (Pl. 8B, 15)
- 9) One bronze wheel-shaped object with remains of a nail. (Pl. 8B, 14)
- 10) One bronze double-drum fibula. (Pl. 8B, 17)
- 11) Three small bronze rein-knobs. Lost. (Pl. 8B, 13)
- 12) Bronze rod-shaped pendant. Lost. (Pl. 8B, 18)
- 13) Several bronze nails with large spherical heads. Lost.
- 14) Complete pottery bowl with everted rim, height 90 mm, width 130 mm. Lost. (Pl. 8B, 19)
- 15) sherds from at least three different pottery vessels; the decoration consists of incised lines filled with a white substance, and graphite and red painting. (Pls 8B, 16.20.21; 9A)

Museum: Musée Historique, Mulhouse (inv. nos 1955-1962. 1968).

4 'Burgundy'

References: Brulard 1910, 203; Joffroy 1958, 120-121; Drack 1958a, 66; Wamser 1975, 135-136.

Description: An iron nave fragment forms part of the collection of R. Brulard, housed in the Musée Archéologique, Dijon. The piece is marked with the provenance 'tumulus du Tremblois', but in Brulard's published account of his excavation of this tumulus, he did not mention it.

The tumulus measured 22 m in diameter with a height of 2.60 m, and contained a stone core. The primary grave was an inhumation, in the centre of the stone core, orientated (head)NW-SE(feet). The inhumation was provided with a bronze bracelet (Brulard 1910, fig. 12), two amber beads ca. 15 mm in diameter (ibid. figs 13; 14), and a bronze razor (ibid. fig. 15; Wamser 1975, pl. 19, 4). To the left of the skeleton was an iron sword, 980 mm long, with flat hilt and iron rivets, according to Wamser a 'Hallstatt sword' (1975, 135-136). Around the skull were numerous small bronze nails ca. 7 mm long (of which 140 survive), mixed with a black substance, possibly remains of a leather helmet. The tumulus also contained a secondary grave without goods.

Comments: It is strange that Brulard did not mention the presence of iron fragments in this tumulus, although in a wagon grave one would normally expect numerous fragments from the iron tyres, naves etc. It is therefore unlikely that the nave fragment came from the 'tumulus du Tremblois'. According to Joffroy, Brulard's collection is made up exclusively of finds from Burgundy, so that even if the nave fragment did not come from the 'tumulus du Tremblois' (Magny Lambert), a provenance in Burgundy is very likely.

Finds:

- 1) One fragment of an iron nave sheathing of type Cannstatt, external diameter 132 mm, internal diameter 104 mm. The fragment is composed of two pieces of iron sheet, both of

which had remains of a raised rib. Drack (1958a, 66) wrote that the nave fragment bears inlaid bronze decoration, but no traces of such decoration were visible to the author. (Pl. 10A)

Museum: Musée Archéologique, Dijon (inv. no. 10.074).

5 Chouilly, 'Les Jogasses', grave 16

(c. Épernay, ar. Épernay, dép. Marne)

References: Favret 1925, 71-80; Favret 1927, 80-146; Favret 1936, 24ff.; Joffroy 1958, 130-133; Hatt and Roualet 1976, 429-30; pl. 6.

Description: This was the only wagon-grave in a cemetery of 185 flat graves. The grave comprised a rectangular pit (1.8 x 2.7 m), 800 mm deep, orientated NE-SW (Fig. 157). The grave was covered by a stone packing 400 mm thick, containing two secondary inhumations. In the wagon-grave itself was an extended inhumation orientated along the long axis of the grave pit. In the SE corner was a single pottery vessel (Hatt and Roualet 1976, pl. 6, 804). On the floor of the grave were four wheel-slots, 850 mm long, 500 mm deep and 200 mm wide. These indicate a wagon with a wheel-gauge of 1.10 m and a wheel-base of 1.40 m.

In the slots were iron tyres of type VI, 22-23 mm wide and 850 mm in diameter. The ends of the tyres were apparently riveted together (Pl. 10B, 1.2.5). The tyres were fitted with nails every 120 mm. The nails had large circular heads of type D and the tips were bent over showing a felloe height of 60 mm (Pl. 10B, 3.4). The wagon fittings also included iron felloe-clamps (Pl. 10B, 8). The naves were fitted with iron hoops 22 mm wide and 150 mm in diameter, with a slightly conical form. Between the E wheel pair was a looped iron nail, which could be interpreted as the kingpin which held a pivoted front axle (Favret 1927, 102, fig. 8, no. 2). Finally, the grave contained two iron horse bits (Pl. 10B, 7.9).

Museum: Musée Municipal, Épernay.

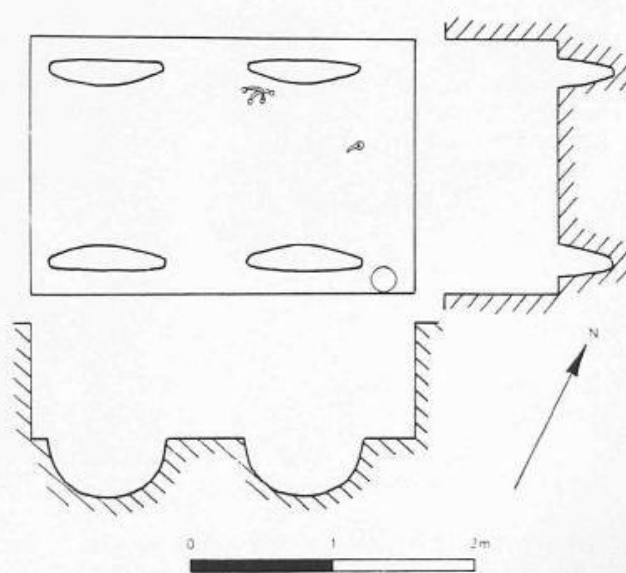


Fig. 157 Chouilly, 'Les Jogasses', grave 16: plan and profile of the grave (after Favret 1936).

6 Evans, 'Les Sarrasins'

(c. Dampierre, ar. Dole, dép. Jura)

References: Rousset 1855, 77; Millotte 1963, 294.

Description: A 'vast' tumulus was excavated by T. Bruand in about 1849. A number of objects, all lost, are reported to have been found in this tumulus, including 'nombreux ossements humains ... des sabres, et des débris d'armures en cuivre' (Rousset 1855, 77); 'un disque à renflement central ... une pièce en bronze ajourée' (Millotte 1963, 294); and 'cercle, fer, long. 11 cm, larg. 9 mm ... Don T. Bruand 1849' (Archives du Musée Archéologique 1849, registre II - manuscript in the Museum Besançon).

Comments: The grave finds seem to have included an iron tyre and probably a nave-cap. Sadly, all the finds have been lost and so it is impossible to be certain.

Museum: Musée des Beaux-Arts et d'Archéologie, Besançon (inv. no. 404, Lost).

7 Forêt des Moidons/Chilly-sur-Salins, tumulus 2

(ar. Lons-le-Saunier, dép. Jura)

References: De Morgan 1921, 65-68; Piroutet 1928, 223-224, note 1; Drack 1958a, 64-5; Joffroy 1958, 25-31; Millotte 1963, 281-2.

Description: M. Piroutet began to excavate this tumulus in 1904, but before finding anything he was forced to stop work. J. de Morgan continued the excavation in 1906. The tumulus measured 16-17 m in diameter, with a (probable) height of 2.2 m. The tumulus consisted of a simple pile of flat stones containing a single inhumation orientated (head)S-N(feet) (Fig. 158). Sadly, de Morgan's account of his excavation is imprecise and it is very difficult to identify the goods from this grave among his other finds from the Forêt des Moidons. However,

Joffroy attempted to identify the goods, and his results are summarised below.

To the E of the head was a large brown pottery vessel. Three fibulae were found, one near the neck, one to the right of the body, and the third just to the W of the grave (Joffroy 1958, 27, fig. 5, 4-6): 1) an arched fibula with simple drum on the foot, 2) a fibula with the arch in the form of a conical drum, riveted to the foot is a bronze button surmounted by a piece of coral, the spring has six loops and has a separate axle, 3) a fibula with a notched bow and a foot formed by a stylised bird's head. On the chest were two blue glass beads with white zig-zag decoration (ibid. 27, fig. 5, 2.3). On the waist were some fragments of embossed bronze sheet, from a bronze belt-sheet (ibid. 29, fig. 6, 5.6). On each arm were numerous arm-rings, probably including: two solid bronze arm-rings sparsely decorated with groups of ribs, the ends flattened and fastened by a rivet (ibid. 27, fig. 5, 8); two simple solid bronze arm-rings (ibid. 27, fig. 5, 7). There was a large hollow bronze arm-ring by the left wrist; each ankle had a large hollow bronze sheet ring decorated with groups of four or five ribs (ibid. 29, fig. 6, 1). Outside the grave, 'by the foot', was a small looped bronze rod (ibid. 27, fig. 5, 9). Outside the grave, to the W, was a large (?hollow) bronze bracelet. To the left of the inhumation, a little higher than the head, was a piece of bronze sheet perforated by six holes (ibid. 29, fig. 6, 4). Finally, the grave contained a large flat-bottomed bronze cauldron with a rim diameter of ca. 350 mm and 130 mm high; at the rim were some holes with iron rivets.

Four iron tyres were found to the N of the skeleton. These were not kept by the excavators. On de Morgan's plan of the grave (Fig. 158), the tyres are shown each with eight nails, but it is doubtful whether this is accurate.

Comments: It must be emphasised that Joffroy's identification of the grave goods is doubtful.

Museum: Musée des Antiquités Nationales, Saint-Germain-en-Laye (wagon finds lost).

8 Grandvillars

(ar. Belfort, Territoire-de-Belfort)

References: Viellard 1922, 98-109; Drack 1958a, 65; Joffroy 1958, 51-56.

Description: This tumulus was excavated by A. Viellard in 1919 and measured 25 m in diameter, with a height of 1.4 m. The excavator opened a trench 1.10 m wide, which he extended in the centre of the tumulus to a square measuring 5 x 5 m. A plan of the finds is shown on Fig. 159. At 'a', a pile of cremation was found at a height of 1 m above the natural soil. Another pile of cremation was found 600 mm above the natural soil at 'b', here associated with two plain solid bronze leg-rings (Joffroy 1958, 53, fig. 10, 8), two hollow bronze ear-rings (ibid. 53, fig. 10, 1.2), and a bronze bracelet (ibid. 53, fig. 10, 10?). At 'f', 600 mm above the natural soil, there was a schist bracelet (ibid. 53, fig. 10, 9), two bronze rings (ibid. 53, fig. 10, 3-5?), an iron ring and a bronze bracelet (ibid. 53, fig. 10, 10?). At 'g', 400 mm above the natural soil, a bronze 'basin-shaped' vessel with hollow bronze handles was found, the rim of which was decorated (one fragment is shown on Viellard 1922, 105, fig. 4, 5).

Four iron rods were discovered at points 'e' on the plan. They were located 500 mm above the natural soil, as were the rest of the wagon remains, which comprised iron tyres and nave fittings. The remains of two wheels were found at 'c' and 'd'; iron tyre fragments were also found further to the E.

The excavations were restricted to a 5 x 5 m square in the

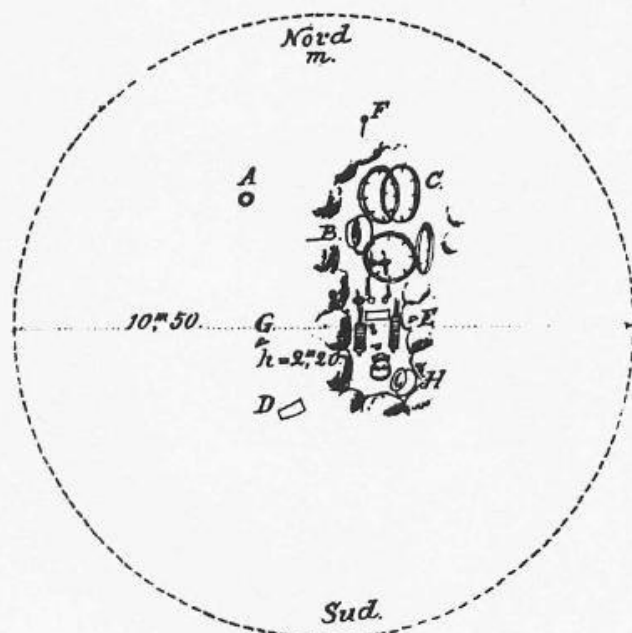


Fig. 158 Forêt des Moidons/Chilly-sur-Salins, tumulus 2, plan of the tumulus: A Bronze bracelet; B Bronze cauldron; C Iron tyres; D Fragments of bronze sheet; E and G Fibulae; F Pin (after de Morgan 1921).

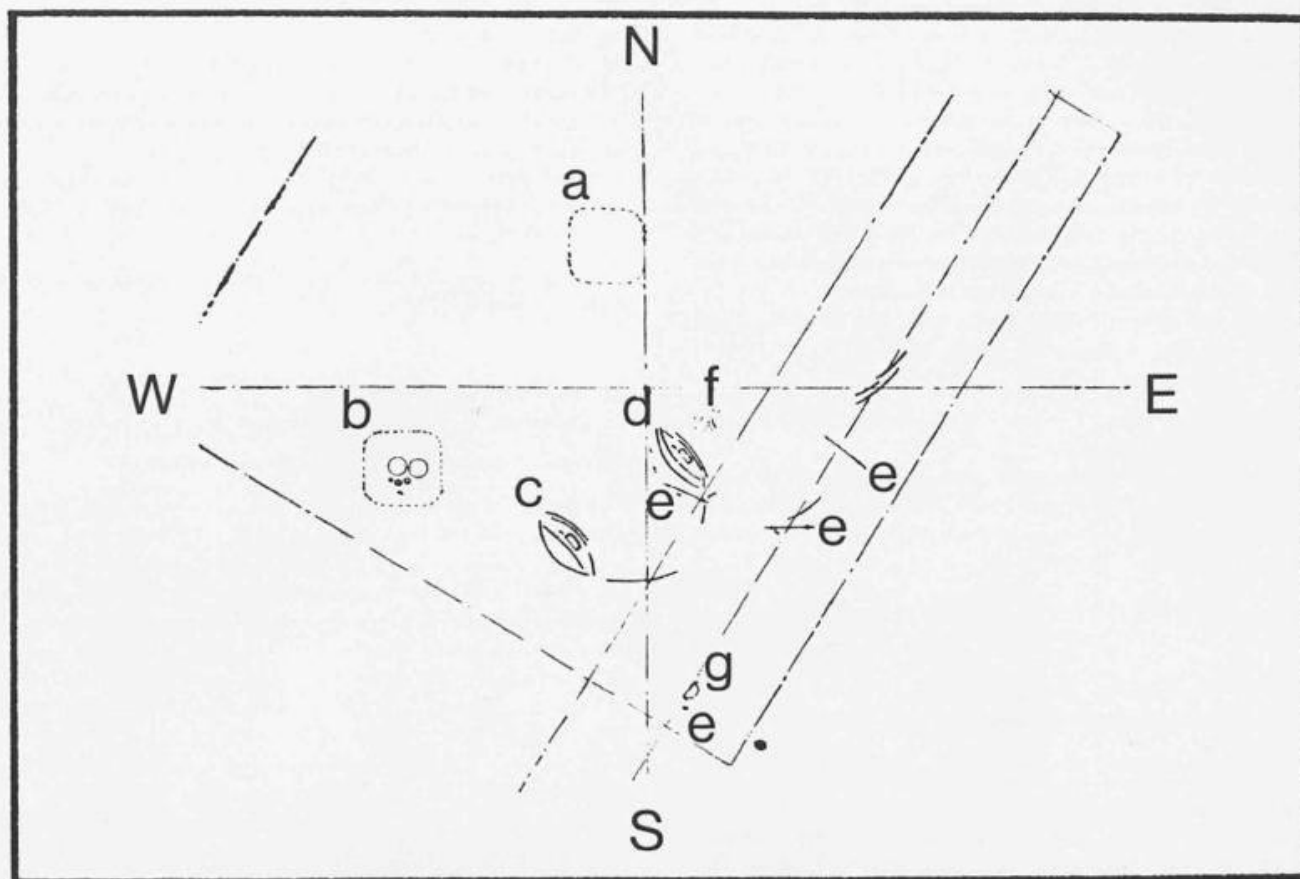


Fig. 159 Grandvillars: plan of the excavated area (after Viellard 1922). - Scale 1:50.

centre of the tumulus and it seems likely that if the excavated area had been extended to the S and E, further remains of the wagon-grave would have been uncovered. Too many tyre fragments survive for a two-wheeled vehicle, so it is almost certain that only half of the wagon is represented on the excavation plan (Fig. 159).

Three fragments of embossed bronze sheet also came from this tumulus, but their exact original location is not known (Joffroy 1958, 53, fig. 10, 6.7).

Comments: One of the four iron rods was analysed by Viellard: carbon 0.09%, phosphorous 0.015%, sulphur 0.041%, and silicon 0.09%. Part of the bronze vessel was also analysed, and was found to have a 5% tin content.

While the wagon remains and the bronze vessel were found relatively close to the natural soil (400-500 mm above), some of the other finds were located higher in the tumulus. In particular, the cremated bone at 'a' was 1 m above the natural soil; the finds at 'b' and 'f' were both 600 mm above the natural soil. While it seems probable that 'a' and 'b' are both secondary graves, it remains uncertain whether the finds at 'f' belong to the central wagon-grave.

Finds:

- 1) 27 fragments of iron tyres of type VI, width 25 mm. The nails are spaced ca. 220 mm apart, and have large square or rectangular heads of type E. (Pl. 9B, 1.7.8)
- 2) Fragments of iron nave fittings of type Grandvillars, comprising three nave-caps, 123 mm in diameter and 36 mm in height. The axle-channel is 57 mm in diameter. The

nave-cap is provided with three or four nails with large heads, which are today globular in shape. (Pl. 9B, 6)

- 3) One circular iron domed fitting, possibly an axle-cap, 50 mm in diameter. (Pl. 9B, 3)
- 4) Four iron rods, one of which was destroyed to provide the chemical analysis (see above). Two of the surviving rods are straight, one is bent. The rods are round in cross-section, and all have thickened ends. Each of the rods has one end terminating in a flat rectangular tongue, while the other end has a pointed projection, round in cross-section. (Pl. 9B, 2.4.5)
- 5) Bronze sheet 'basin-shaped' vessel, with a decorated rim. The vessel had hollow bronze handles. Lost.

Museum: Musées d'Art et d'Histoire, Château de Belfort, Belfort.

9 Hatten

(c. Soultz-sous-Forêts, ar. Wissembourg, dép. Bas-Rhin)

References: Frey 1957.

Description: This tumulus measured 7 x 12-15 m with a height of 4 m, and was excavated in 1851. Two 1.5 m wide trenches were opened, one running N-S, the other E-W, crossing in the centre. In the centre of the tumulus, at a depth of 2 m, a collection of rich finds was uncovered, comprising a bronze *Schnabelkanne* (Frey 1957, 232, fig. 1 and pl. 17, 3), a bronze *Plumpe kanne* with lion's head attachment (ibid. pls 16; 17, 1-2), a

bronze cauldron with iron ring-attachments (ibid. 234, fig. 2, 1), a bronze bowl (ibid. 234, fig. 2, 2), a bronze handled dish of type 'Hatten' (ibid. 234, fig. 2, 3 and pl. 18, 2), a boar's tusk (ibid. 235, fig. 3, 8), a gold neck-ring with rounded or profiled cross-section (ibid. pl. 18, 1), an iron spearhead (?), four iron tyres, of which one pair was supposedly smaller than the other (lost), and four iron rods with decorated bronze heads (Pl. 10D). No traces of the burial were found, although the bronze cauldron, dish and bowl were apparently filled with ashes. The excavators found traces of wood above and below the bronze vessels and this could indicate the remains of a wooden grave chamber.

The SW quadrant of the tumulus was also excavated and contained remains of secondary graves (Frey 1957, 235, fig. 3, 1-7).

Wagon finds:

- 1) Four iron tyres. Lost.
- 2) Four iron rods with decorated cast bronze heads. The heads are spherical to biconical in shape, sit on a conical base and have a spherical button on the top. The bronze heads are ca. 50 mm high. (Pl. 10D)

Museum: Musée d'Unterlinden, Colmar.

10 Ivory, 'tumulus de Champ Peupin'

(c. Salins-les-Bains, ar. Lons-le-Saunier, dép. Jura)

References: Joffroy 1958, 17-24; Millotte 1963, 305.

Description: This tumulus was one of the largest in the Forêt des Moidons, measuring ca. 23 m in diameter, with a height of 2 m. The first excavation was conducted in 1869 by C. Toubin, who uncovered two graves quite close to the surface. M. Piroutet excavated the tumulus completely in 1921 and left an unpublished account of his findings, which was used by Joffroy (1958, 17-24). The tumulus contained a stone core more than 1 m in height and 16 m in diameter. The central grave seems to have been robbed in antiquity and must have extended below the level of the natural soil. Piroutet found four secondary graves, which were all in the stone core (see the plan published by Joffroy 1958, 19, fig. 3, 1).

The wagon-grave was situated N of the centre of the tumulus and was formed by a chamber ca. 2.40 m in length, containing an inhumation orientated (head) NNW-SSE (feet). The inhumation seems to have been positioned on a four-wheeled wagon, from which remains of iron tyres and iron nave-caps survived. In the right eye-socket of the inhumation was an iron ring, and to the right of the body was an iron nail. The grave also contained some fragments of iron bands bearing traces of wood, measuring 15 mm in width. The inhumation was provided with a pair of fibulae, on its neck and left shoulder. At its waist, the inhumation had a short chain of eight bronze rings.

Comments: According to J.-P. Mohen, the wagon finds from this grave, originally in the Musée des Antiquités Nationales, Saint-Germain-en-Laye, have been lost.

Finds:

- 1) Remains of four iron tyres of type VI, ca. 750 mm in diameter, width ca. 26 mm. According to Piroutet, the tyres were similar to those from Saraz and were fitted with nails with large circular heads (type D), positioned 140 mm apart. Lost. (Pl. 10C, 1)
- 2) Iron nave-caps, 108 mm in diameter, with a thickened opening for the axle, 48 mm in diameter. The nave fittings are of the type 'with simple iron nave-caps'. Lost. (Pl. 10C, 2)

- 3) Iron nail. Lost.
- 4) Iron ring. Lost.
- 5) Two identical fibulae, without springs but with disc-shaped cloth-holders. The bow is formed by a rectangular plate bearing engraved decoration. The foot was terminated by a coral button. (Joffroy 1958, 23, fig. 4, 5)
- 6) Belt fitting comprising a chain of eight bronze rings and a clasp formed by a riveted bronze band. (Joffroy 1958, 23, fig. 4, 6)

Museum: Musée des Antiquités Nationales, Saint-Germain-en-Laye (wagon finds lost).

11 Marainville-sur-Madon

(c. Charmes, ar. Épinal, dép. Vosges)

References: Burnand 1980, 431; Olivier 1988.

Description: This tumulus grave was uncovered by a farmer in 1977. Excavations took place in winter 1979/80. The tumulus measures about 40 m in diameter with a present-day height of less than 1 m. The excavators believe that the wagon-grave was probably housed in a wooden chamber, protected by a stone packing. The grave finds are not yet fully published, but have been introduced in a report by L. Olivier (1988). Apart from the inhumation burial, the grave finds included a four-wheeled wagon, horse-gear, an iron sword with an ivory pommel inlaid with amber, a bronze cauldron and a profiled bronze cup (Olivier 1988, 278, fig. 3; 280, figs 5-6). The wagon fittings included tyres of type VC bearing wood grain from a felloe of Gottesberg type. Furthermore the finds included nave fittings of type Erkenbrechtsweiler (ibid. 279, fig. 4). The nave-neck sheathing bore wheel- and horse-shaped stamped decoration (Fig. 66, 2); the same stamped decoration could be seen on some fragmentary felloe-clamps (Fig. 66, 1). The nave-cap was especially interesting, made of iron but with inlaid bronze triangles forming a zig-zag pattern. The horse-gear included two iron bits, four bronze domed rein-knobs of rather atypical form, and a number of bronze and iron rings.

Less than 3 km from Marainville-sur-Madon, a second vehicle-grave was excavated by L. Morel in 1880, at Diarville (dép. Meurthe-et-Moselle). The grave contained iron tyres, an iron sword, bronze vessels, pottery and a gold band ca. 400 mm long. Owing to the association of a gold band (?neck-ring) with an iron sword, an early La Tène date may be preferable to a position in Ha C or D. The nearby hillfort of Saxon-Sion, 'Côte de Sion', where a Cylix in Etruscan *bucchero nero* was apparently found, is another element contributing to the special (?princely) nature of Marainville-sur-Madon and its environs.

In 1990, excavations by L. Olivier and his team led to the discovery of two new wagon-graves in the vicinity of the hillfort of Saxon-Sion. For further information on these graves, in the *comune* of Diarville, see the Addenda to the catalogue.

Museum: Musée du Fer, Jarville.

12 Ohnenheim

(c. Merckolsheim, ar. Sélestat-Erstein, dép. Bas-Rhin)

References: Forrer 1921a, 1195-1242; Paret 1935a, 27; Drack 1958a, 65; Joffroy 1958, 122-129; Egg 1987a.

Description: This tumulus was one of a group of at least 90 tumuli spread through the *comunes* of Ohnenheim, Heidolsheim and Mussig. The tumulus with the wagon-grave is marked no. 9 on Forrer's plan of this tumulus group (Forrer 1921a, 1196, fig.

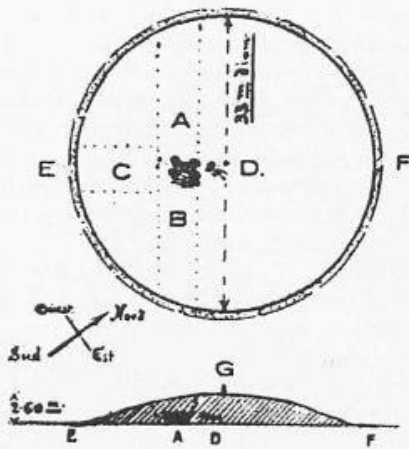


Fig. 160 Ohnenheim, plan of the excavations (after Forrer 1921a).

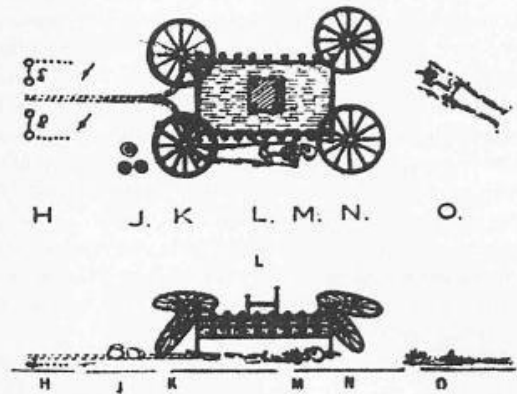


Fig. 161 Ohnenheim, plan of the wagon-grave, according to R. Forrer (after Forrer 1921a).

196). The tumulus measured 33–34 m in diameter, with a height of 2.6–2.7 m. In 1917, some Bavarian soldiers stationed at Ohnenheim used this tumulus as a target for their shooting range. To this end, they dug two trenches in the SW half of the tumulus: the one running NW-SE was 2.5 m wide and 4 m deep (Fig. 160, A-B) the other running SW-NE was 7 m wide (Fig. 160, C). In the process of these excavations, they uncovered a skeleton and most of the finds to be considered below. About five months later, the finds were given to R. Forrer, along with a report giving the approximate position and depth (2.6–2.8 m) of the find. At that time, Forrer sent a workman from the Strasbourg museum to collect further finds from the disturbed part of the tumulus. It was only in 1920 that Forrer was able to make a complete excavation of the remains of the tumulus.

Among the finds uncovered by the soldiers' trenches were a number of human bones and further bones were found by Forrer to the N of trench A-B (Fig. 160). The bones discovered by Forrer came from the head and shoulders of the skeleton, and from this he concluded that the inhumation had been orientated (head)NE-SW(feet). Wagon finds were only discovered by Forrer to the W of the inhumation; indeed, the bones from the right side of the skeleton were discoloured by rusted bronze and iron, while the left side bore no traces from metal objects. Forrer concluded that the inhumation was positioned by the SE side of the wagon.

All the pottery sherds, as well as the harness fittings, were uncovered by the soldiers' trenches and this lead Forrer to believe that they were originally positioned to the SE of the wagon and inhumation. Forrer's reconstruction of the position of the grave goods is shown on Fig. 161.

Further to the N and higher in the tumulus (1.60 m deep compared to 2.6–2.8 m deep) he discovered a secondary inhumation, without grave goods.

The wagon finds included tyre fragments, fragments of iron and bronze nave sheathings, cast openwork plaques, cast bronze 'angle-sockets', iron rings, cast bronze 'L'-shaped sockets, cast bronze 'beaked' sockets, and cast bronze 'T'-shaped terminals. According to Forrer, tyre fragments were found both at the N and S ends of the wagon and he suggested that this implies that the wagon had four wheels. Forrer also noted some other observations from *in situ* finds, which provide useful information for an understanding of the construction of the wagon-box. Thus: '... (1a) distance (1 m) dans laquelle notre ouvrier a trouvé

les deux côtés est et ouest du char, indiqués dans la terre vierge ou presque vierge par deux lignes parallèles imprégnées de rouille de fer et de bronze produites par les anneaux résonnants en fer et les plaques ajourées en bronze. Plusieurs fragments de ces objets ont été trouvés sur ces lignes tandis qu'ils faisaient entièrement défaut dans l'espace compris entre ces deux lignes' (Forrer 1921a, 1220). This suggests that the wagon-box was about 1 m wide; furthermore he discussed the position of the cast bronze openwork plaques and the iron rings: 'De plus, nous avons trouvé des fragments de ces plaques ajourées accompagnés en assez grand nombre de fragments de ces anneaux en fer et toujours le long de la ligne que marquait le côté latéral du char. Il s'ensuit que ces anneaux ornaient les bords latéraux de la caisse du char' (Forrer 1921a, 1223). Thus the long sides of the rectangular wagon-box seem to have been decorated with the bronze plaques and iron rings. Forrer was not able to determine the length of the wagon-box.

Recent research by Dr M. Egg of the Römisch-Germanisches Zentralmuseum, Mainz, has shed new light on the construction of the wagon-box (Egg 1987a). He was able to show that the projections on some of the bronze plaques (type 2) correspond to the holes in the cast 'angle-sockets'. He concluded that the 'angle-sockets' formed the corners of the upper railing of the wagon-box, and held in place openwork bronze plaques, which formed the sides of the wagon-box (the wooden frame of the box was made of ash). Thus Forrer's reconstruction of the Ohnenheim wagon (Fig. 2), carrying a throne made from the bronze 'angle-sockets', can definitely be rejected. Dr Egg also reconstructed a wheel from the Ohnenheim wagon with a nave of type Ins and felloes of Großbistadt type (Fig. 57).

Finds:

- 1) 11 fragments of iron tyres of type III, 19 mm wide, ca. 765 mm in diameter. The tyres are fitted with nails with large globular heads; the nails are spaced irregularly, 70–145 mm apart. One tyre fragment (Pl. 10E, 1) is from the join of the iron tyre; it seems that the join had to be repaired, using two extra nails. The nails bear wood grain showing that the felloe was of Großbistadt type, with an external plank felloe of beech wood 45 mm thick and a spanned internal felloe of ash. The wood grain on the nails indicates four external felloe segments. (Pl. 10E, 1–3)
- 2) Two fragments of ribbed iron nave-neck sheathing, possibly

from a nave of type Ins. On the inside of both fragments there is a fragment of bronze sheet. (Pl. 10E, 7.8)

- 3) Two fragments of bronze sheet. These seem to have surrounded a circular object. One edge of the bronze sheet was covered by another piece of bronze sheet, the two sheets being fixed together by bronze spherical-headed nails. M. Egg believed that these fragments came from the nave-stock, fitting between the bases of the spokes. (Pl. 10E, 9.10)
- 4) Three fragments of cast bronze openwork plaques of type 1. These were originally ca. 127 mm long and at least 100 mm high. The decoration consists of a row of openwork triangles, two rows of hemispherical cups, and an arrangement of openwork triangles and lozenges; this decoration was probably repeated on the other side of the plaque, which has not survived. (Pl. 11, 1)
- 5) 10 fragments of cast bronze openwork plaques of type 2. These were ca. 292 mm long and 75 mm high. The decoration consists of a row of hemispherical cups, a row of openwork triangles and lozenges, and a row of hemispherical cups. One fragment (Pl. 11, 9) is particularly well preserved and comes from the corner of the wagon-box. At the corner is a thick iron rod, to which the ends of two plaques are held by rust (a similar iron rod is seen on Pl. 11, 2). One of the plaques is fully preserved and on each long side three bronze tongues, or their remnants, can be seen (Pl. 11, 9). On the upper side, the two tongues close to the corner were smaller than the third tongue. The tongues on the lower side are all of the larger size. Similar tongues are seen on the incomplete plaques (Pl. 11, 2.7.8). (Pl. 11, 2.7-9)
- 6) Four fragments of cast bronze openwork plaques of type 3. These are about 63 mm wide and 67-70 mm high. In the middle of the plaque is a central tube which holds an iron rod. Either side of the tube the plaque has openwork triangular decoration. The upper and lower sides of the plaques each have two tongues. Remains of wood and leather or fur are seen on the backs of all four of the fragments. (Pl. 11, 3-6)
- 7) Six fragments of cast bronze 'angle-sockets'. The sockets are hexagonal in cross-section and are 'L'-shaped. Remains of at least three 'angle-sockets' survive. The 'angle-sockets' were each composed of two sockets set at right-angles. At the join of the two sockets there is a hole which passes through both sides of the cast bronze tube. This perforation still holds remains of an iron rod (Pl. 14, 3.6). Apart from this hole, each of the arms had two more perforations through one side of the cast bronze tube. One of the perforations holds a 'tongue' from one of the cast bronze plaques described above (Pl. 14, 8). The positions of the iron rod and the perforations corresponds to the positions of the iron rods and (smaller) tongues on the cast bronze plaques of type 2 and it is obvious that the 'angle-sockets' were fitted on the upper edge of the corners of the wagon-box (e.g. Pl. 11, 9), the sides of which were, at this point, formed by openwork bronze plaques. (Pl. 14, 3.6.8.9)
- 8) Two cast 'L'-shaped sockets. The sockets are composed of a long cylindrical part (163-168 mm long), with flaring ends and a central thickening. Both ends of the cylinder are flat with a central circular opening 24-25 mm in diameter. The ends nearer the rectangular socket are slightly larger and rounder than the other ends, which are slightly smaller and oval-shaped. (Pl. 13)
- 9) Two cast bronze 'beaked' sockets. One end of the object is formed by a curved beak, the other by a circular socket. In the middle are two lateral projections, each with a central circular opening ca. 23 mm in diameter. The lateral projections are slightly flattened or oval in shape. (Pl. 12)
- 10) Two fragments survived which seem comparable to the 'L'-shaped and the 'beaked' sockets. However, the fragmentary rectangular socket (Pl. 14, 5) is longer, 65 mm, than those of the 'L'-shaped sockets. The other fragment (Pl. 14, 4) has a different profile than the lateral projections of the beaked sockets. But this fragment is also oval in shape and has a central perforation corresponding in size to those of the 'L'-shaped and beaked sockets. (Pl. 14, 4.5)
- 11) Two cast bronze 'T'-shaped terminals. The terminals have a tapering pentagonal socket bearing a 'T'-shaped cross-bar, which is round in cross-section. On both of the examples, the upper part is of solid bronze and seems to have been cast on secondarily (*Überfangguss*). On both of the terminals, the top of the solid part of the socket has a small rectangular hole, which seems to hold an iron fragment. (Pl. 14, 1.2)
- 12) Cast bronze disc-headed socket. The middle of the cup-shaped disc is perforated, and the perforation holds two iron fragments. Forrer suggested that the iron (?) nails held an organic object, possibly spherical, to form the head of a sceptre. (Pl. 10E, 4)
- 13) Fragmentary sets of four iron rings. Forrer counted about 30 iron rings, which would imply at least eight sets of four rings. Today, remains of only about six sets of four rings survive. Each set of four rings is composed of a pair of iron rings looped onto another pair of iron rings (for example Pl. 15A, 9). Most of the iron ring sets bear traces of wood grain, and one also carries traces of bronze sheet (Pl. 15A, 13). (Pl. 15A, 8.9.11.13)
- 14) Six fragmentary bronze hemispherical rein-knobs. (Pl. 15A, 1-5)
- 15) One looped bronze hemispherical rein-knob. The loop carries the remains of a large iron ring. (Pl. 15A, 6)
- 16) Two iron rings, possibly from horse-gear. (Pl. 15A, 7.12)
- 17) One cast bronze rein-ring with a stepped profile. The rein-ring sits on a hemispherical knob. At the top of the rein-ring was a small bronze loop, which is now incomplete. (Pl. 14, 7)
- 18) One bronze ring. (Pl. 15A, 10)
- 19) Fragmentary iron riveted fitting. The riveted fitting holds a thick iron ring. (Pl. 10E, 6)
- 20) Hollow cast profiled bronze terminal knob. The top of the knob is perforated and holds a piece of iron wire. (Pl. 10E, 5)
- 21) Two fragments of an iron sword. The two fragments are seen rusted together on Forrer 1921a, pl. 31, T. See also Egg 1987a, 79, fig. 2, 2.
- 22) Eight sherds from at least five different pottery vessels. Only one decorated sherd survives. This bears incised 'ladder' decoration and graphite and red painting. On this sherd the zone between the two incised zig-zag 'ladder' motifs is painted red, otherwise the outside of the sherd is graphited. (Pl. 10E, 11)
- 23) Animal bones, including deer, bird and rabbit. Forrer suspected that some of the bones were modern.

Museum: Musée Rohan, Strasbourg (inv. nos 28.130 - 28.199).

13A Sainte-Colombe, 'tumulus de la Butte'

(c. Châtillon-sur-Seine, ar. Montbard, dép. Côte-d'Or)

References: Flouest 1875, 1-88; Henry 1933, 170-171; Drack 1958a, 66; Joffroy 1958, 71-83.

Description: The 'Tumulus de la Butte' was located ca. 800 m NW of 'La Garenne'. It measured 76 × 46 m (the oval shape probably caused by agricultural activity), with a height of 2 m, and was excavated by J. Beaudoin in 1863. The tumulus was apparently constructed with layers of clay, stones and earth.

Beaudoin excavated a trench 2 m wide leading from the ENE side of the tumulus. 15 m from the centre he came upon a burnt layer with ashes and charcoal, several metres in diameter. The wagon-grave was situated in the centre of the tumulus and was surrounded by a circular ditch, 350 mm deep and 550 mm wide at the top, filled with pebbles. The grave was probably provided with a wooden chamber, but no proof of this survived.

The inhumation lay on a brown layer, probably wood, and was surrounded by wagon fittings. Apparently, the four wheels had been taken off the wagon and were placed flat symmetrically on either side of the body. The body was orientated (head)E $\frac{1}{4}$ S-W $\frac{1}{4}$ N(feet). On each wrist the inhumation had a gold arm-band 54 mm wide with repoussée decoration (Joffroy 1958, 79, fig. 16, 2); on each side of the skull was a finely decorated gold ear-ring (ibid. 79, fig. 16, 3). The grave was also provided with two iron axes with square sockets, lengths 120 and 140 mm (ibid. 79, fig. 16, 4), and a number of pottery vessels (including ibid. 79, fig. 16, 5).

6 m SW of the inhumation, obviously outside the grave, was a large stone, probably a grave stela, measuring 1.15 × 0.25 × 0.2 m, under which were some ashes and sherds of a coarse vessel.

Comments: The author was not able to gain permission to study all the finds from this grave, and so it has been necessary partly to rely on the drawings of R. Joffroy.

Wagon finds:

- 1) Remains of iron tyres of type VII, ca. 42 mm wide, with large nail-heads of type D. Diameter 850 mm. (Pl. 16, 14)
- 2) Ribbed iron nave fittings of type Cannstatt. The reconstruction of the nave published by Joffroy (1958, 79, fig. 16, 8) is based on a drawing by J. Beaudoin (in the archives of the Société Archéologique du Châtillonnais, Besançon); the reconstruction does not seem likely. The only part of the nave which can be reconstructed is the nave-stock, which was fitted with an iron band 50 mm wide provided with eight cylindrical spoke-sockets, ca. 40 mm in diameter (as on the nave from Apremont, Pl. 7, 1). The spokes were likewise provided with iron sleeves which were cylindrical (diameter 43 mm) and fitted over the cylindrical spoke-sockets which projected from the iron band on the nave-stock. The spoke sheathings were ca. 285 mm long and were provided every 45 mm with five hollow collars with 'C'-shaped cross-section, each of which was decorated with nine ribs (Pl. 16, 16). The ends of the axles were fitted with iron axle-caps of type Wellenburg, of which three survive (diameter ca. 128 mm). Each of the axle-caps was assembled from two parts, which were held together by bronze solder. (Pl. 16, 2)
- 3) Beaudoin explicitly described the pole, which projected from the W end of the vehicle (the body was therefore lying with its feet forward on the wagon). According to him, it measured more than 150 mm in diameter at the base and not more than 60 mm in diameter at the tip. The pole was completely covered with iron sheet, some of which still survives. The base of the pole was 'D'-shaped in cross-section and about 95 mm wide. The pole terminates in a 'T'-shape ca. 266 mm in width, the arms of which are circular in cross-section and 60-67 mm in diameter (Pl. 16, 13). One fragment of iron sheet, probably from the 'T'-shaped end of the pole, bears ribbed decoration (Pl. 16, 15).

The end of the pole pivoted on a small draught pole axle. The end of this axle was provided with a small axle-cap, complete with linchpin; according to Beaudoin, the flange of the axle-cap was originally 60 mm in diameter (Fig. 72, 20; Pl. 16, 6). (Pl. 16, 6.13.15)

- 4) Three fragments of iron sheet with large hollow stepped bosses, probably decoration from the wagon-box. (Pl. 16, 3.5)
- 5) One half-cylinder made from ribbed iron sheet. One end is terminated by a 'D'-shaped piece of iron sheet. (Pl. 16, 1)
- 6) Three iron phalerae with embossed decoration. (Pl. 16, 4)
- 7) Two iron rein-knobs with stepped profile. (Pl. 16, 11)
- 8) One hemispherical iron knob provided with a nail. (Pl. 16, 12)
- 9) Several iron rings, one of which with remains of a leather rein. (Pl. 16, 10)
- 10) Fragmentary iron 'omega-clip'. (Pl. 16, 9)
- 11) Two iron fragments, probably from cheek-piece terminals. One fragment is very corroded, comprising a tapering iron tube (tapering from 17 mm to 8 mm in external diameter), on the surface of which fine ribbing is visible. The other fragment has a hollow lens-shaped terminal. (Pl. 16, 7.8)
- 12) At the front end of the pole Beaudoin apparently found some débris from a chain, probably the fragmentary horse bit (Joffroy 1958, 81, fig. 17, 8), and four sets of four rings looped together (ibid. 81, fig. 17, 7).

Museum: Musée des Antiquités Nationales, Saint-Germain-en-Laye (inv. no. 18.269).

13B Sainte-Colombe, 'tumulus de la Garenne'

(c. Châtillon-sur-Seine, ar. Montbard, dép. Côte-d'Or)

References: Bourée 1863, 3; Flouest 1875, 1-88; Henry 1933, 170; Joffroy 1958, 57-70.

Description: This tumulus is situated 800 m from the 'tumulus de la Butte'. It was investigated in 1846 and measured 70 m in diameter with a height of 4 m. Deep in the tumulus, under a large stone, were found the remains of a bronze cauldron with gryphon protomes. Below this, on the natural rock which at this point seems to have been slightly hollowed out, were numerous iron fragments, including remains of a tripod. Apart from the tripod and cauldron (Joffroy 1958, 59, fig. 12, 1), the finds included 24 decorative iron nails, iron tyre fragments, two pairs of bent iron rods, some fragments of iron nave fittings, two iron fragments from the base of the spokes and five spherical-headed iron rods.

In the tumulus fill were three human skulls, some leg bones, a few sherds of pottery, an amber disc (ibid. 67, fig. 15, 13) and a fragmentary bronze ring. Finally, in three different positions, 3 m from the tripod, were collections of ash and charcoal.

According to Flouest, three fibula fragments were originally included with the rest of the finds in the *Bibliothèque de Châtillon-sur-Seine*. These are now lost, but drawings by J. Beaudoin survive (Joffroy 1958, 67, fig. 15, 10.11.14). One of the fibula feet had a coral button. Joffroy also found a fragmentary fibula bow, which may stem from this grave (ibid. 67, fig. 15, 12).

Wagon finds:

- 1) Six fragments of iron tyres of type VII, 30 mm in width, and ca. 850 mm in diameter. The nail heads are countersunk (type G) and are spaced ca. 150 mm apart. (Pl. 18, 20)
- 2) Five fragments from ribbed iron nave sheathings of type Cannstatt. Two fragments come from the front of the nave-

head (Pl. 18, 3). Three fragments come from the centre of the nave and remains of two ribs are visible; a fragment also shows the transition to the nave-neck (Pl. 18, 2). (Pl. 18, 2.3)

- 3) Three fragments of iron fittings from the base of the spokes. The spoke sheathing bears two small ribs. The wooden spoke had a diameter of 36-38 mm, and a rectangular tenon measuring 20 x 30 mm. (Pl. 18, 1.4.5)
- 4) One fragment of curved iron sheet, possibly from a felloe-clamp. (Pl. 18, 19)
- 5) Four fragments of iron fittings ca. 18 mm wide and 'U'-shaped in cross-section. (Pl. 18, 17.18)
- 6) Fragments of five or six iron rods with spherical heads. Between the head and the shaft are two ribs. (Pl. 18, 11-16)
- 7) 24 decorative iron nails with large heads. These are of three types: 24 of type Pl. 18, 6-8 and one each of types Pl. 18, 9.10. All the buttons have traces of wood grain on their rear sides. (Pl. 18, 6-10)
- 8) Two sinuous iron rods, 485 and 500 mm in length. The ends of the rods are thickened and then terminate in a flat rectangular tongue. The planes of the flat tongues are set at right-angles. On each of the rods, one of the tongues is perforated. (Pl. 17, 1.2)
- 9) Two bent iron rods, 470 and 500 mm in length. Like the previous two pieces, the ends of the rods are thickened and terminate in flat rectangular tongues which are set at right-angles to each other. (Pl. 17, 3.4)

Museum: Musée de la Société Archéologique et Historique du Châtillonnais, Châtillon-sur-Seine.

14 Saraz

(c. Amancey, ar. Besançon, dép. Doubs)

References: Castan 1858, 389-95; Delacroix 1858, 181-2; Bial 1862, 239-40; Piroutet 1900, 373-4; Drack 1958a, 65; Joffroy 1958, 9-16; Sievers 1982, no. 189.

Description: This tumulus was excavated in 1858 by A. Castan and measured 20 m in diameter and 2.10 m in height. One month before Castan began excavations, a shepherd found a piece of iron tyre near the surface of the tumulus and this may have precipitated the excavations. Castan discovered two complete tyres and the rest of the tyre which the shepherd had found. One of the tyres was positioned vertically. The excavators also uncovered about eight iron nave-caps. Below the wheel remains were two inhumations, one of which was associated with an iron antenna dagger in a bronze scabbard. Below the two inhumations was a stone core. Further excavation uncovered another six inhumations.

Comments: The three fragmentary nave fittings on Pl. 20A, 2.3.5 are not to be found on Bial's illustration of the wagon finds (1862, pl. 2, 12-20). They seem to differ from the other nave fittings and may not belong to this grave.

Finds:

- 1) The type VI tyres were 22 mm wide and 800 mm in diameter, and had nails with countersunk type G heads (8 x 7 mm) spaced 240 mm apart. The longest surviving nail has a penetration of 37 mm. On one tyre, a join of the tyre ends is visible: the two tyre ends are fixed by nails with large subrectangular heads. This may have been a repair. (Pl. 20A, 4)
- 2) Fragments of iron fittings of type Grandvillars from at least four naves. These have an external diameter of 120-128 mm, and an axle-channel 65-73 mm in diameter. The edge

of the axle-channel is thickened. The nave-caps were fixed to the nave by four nails. Three of the nave-caps preserve iron sheet bands, up to 37 mm wide, from the nave-heads (Pls 19, 2.3.5). (Pls 19; 20A, 1)

- 3) Three iron fragments apparently from nave-caps, but of a different type to those above (it is not certain if these fragments belong to the Saraz wagon-grave). (Pl. 20A, 2.3.5)
- 4) Iron dagger with bronze antenna hilt and bronze scabbard. (Sievers 1982, pl. 35, 189)

Museum: Musée des Beaux-Arts et d'Archéologie, Besançon.

15 Savoyeux, 'tumulus du Tremblois'

(c. Dampierre-sur-Salon, ar. Vesoul, dép. Haute-Saône)

References: Perron 1882, 70-73.131.133-137; Drack 1958a, 65-6; Joffroy 1958, 45-50.

Description: This tumulus, measuring only 800 mm in height, was opened in 1880; remains of a central grave were found at a depth of 800 mm.

The excavators found a brown glass bead with a white zig-zag (Joffroy 1958, 47, fig. 9, 1), two profiled amber beads (ibid. fig. 9, 2.3), a fragmentary gold sheet neck-ring, ca. 210 mm internal diameter, with a hollow round cross-section (ibid. 47, fig. 9, 4), a gold sheet bracelet, internal diameter ca. 60 mm, with hollow round cross-section and hook fastening (ibid. 47, fig. 9, 5) and an amphora (possibly imported from the Mediterranean). The grave also contained a large undecorated bronze cauldron with rounded sides (according to Perron it was 150 mm high, had a maximum diameter of 500 mm, and a rim diameter of 350 mm). At opposite sides of the rim were two groups of three rivet holes, from iron ring-attachments.

In each of the four corners of the grave were iron wheel remains. The tyres were 25 mm wide, and were fitted every 120 mm with nails with large square heads (type E). The naves had iron nave-caps (125 mm in diameter, axle-channel 65 mm in diameter) and were provided with iron sheet. The nave fittings were probably of type Grandvillars. Perron, who had excavated the rich wagon remains from Apremont (grave 1), stressed that the wagon finds from Savoyeux were much simpler. He noted that the iron sheet fittings were not profiled, there were no axle-caps and the spokes were not covered with metal sheet.

Perron visited the tumulus three days after the excavation and attempted a further investigation. He was only able to find a fragment of twisted bronze rod, perhaps from a neck-ring or a bronze vessel handle (ibid. 47, fig. 9, 6). He also observed that the grave was surrounded by a large ring of small pebbles.

Comments: According to Perron, the tumulus also contained an iron sickle and ferrule (Joffroy 1958, 47, fig. 9, 7.8) which seem to be much later than the rest of the finds in the grave. The finds from the tumulus were not preserved, and Joffroy's illustrations are copied from Perron (1882, pl. 4; 135, figs 1-5). Note that Drack's description of this grave is, in places, inaccurate. The finds were never given to a museum, and have doubtless been lost.

16 Vauxhautes-sur-Aube

(c. Montigny-sur-Aube, ar. Montbard, dép. Côte-d'Or)

References: Magdelaine and Boutequoy 1882, 109-116; Henry 1933, 175; Drack 1958a, 66; Joffroy 1958, 115-9; Egg 1986b.

Description: This tumulus measured ca. 29 m in diameter with a

height of 2.2 m, and was excavated in 1881 by the Société archéologique du Châtillonnais. The tumulus contained a stone core 6.45–7.0 m in diameter and 1.70 m high (plan and profile of tumulus: Magdelaine and Boutequoy 1882, plate; Joffroy 1958, 119, fig. 29, 1,2). Sadly, the excavators realised that the stone core was disturbed (possibly in antiquity) and the primary central grave had been robbed. Under the stone core, in the central grave, no remains of the burial had survived and there were only a few other finds. These included a black rim-sherd from a pottery bowl (Joffroy 1958, 119, fig. 29, 3), a piece of bone which may have been decorated, a piece of flint, a fragment of iron tyre, a large iron nail and two fragments of nave fittings.

Apart from the central grave, the excavators also found some secondary graves in the tumulus, but the only object found was a small fragment of bronze sheet.

Finds:

- 1) One fragment of iron tyre of type VII, width 32 mm, with one large round type D nail head, ca. 27 mm in diameter. (Pl. 15B, 1)
- 2) Two fragments of ribbed iron nave fittings of type Cannstatt. One fragment comes from the nave-cap, 120 mm in diameter with an axle-channel 53 mm in diameter, and includes part of the nave-head sheathing. The nave-head sheathing is decorated with triangular ribs, on each side of which are smaller ribs (Pl. 15B, 3). The second fragment comes from the nave-stock, ca. 156 mm in diameter. The nave-stock sheathing was decorated with three ribs of the same type and was 31 mm wide. Also preserved is part of the transition to the nave-neck, which was decorated by a single rib (Pl. 15B, 2). (Pl. 15B, 2,3)
- 3) Nail shank covered with wood grain running in a longitudinal direction, length 83 mm. The iron nail shank is rectangular in cross-section and at its thickest part measures 9 × 6.5 mm. (Pl. 15B, 4)
- 4) Black rim-sherd from a pottery bowl. (Joffroy 1958, 119, fig. 29, 3)
- 5) Fragment of bone, possibly decorated. Lost.
- 6) Flint fragment. Lost.

Museum: Musée de la Société Archéologique et Historique du Châtillonnais, Châtillon-sur-Seine.

17 Vix

(c. Châtillon-sur-Seine, ar. Montbard, dép. Côte-d'Or)

References: Joffroy 1958, 84–114; *ibid.* 1962; Egg and France-Lanord 1987.

Description: The tumulus of Vix is situated at the foot of the *Fürstensitz* of Mont Lassois. Although the tumulus was completely flattened, its stone core was discovered in 1953 by the farmer M. Moisson, who decided to investigate – finding one of the handles of the famous bronze crater. The excavation was continued by R. Joffroy who found that the stone core still survived to a height of 800 mm; Joffroy estimated that the tumulus originally had a diameter of ca. 42 m, with a height of 5 m. The wooden grave chamber was found in the centre of the tumulus, and measured 3.10 × 2.75 m, orientated E-W/N-S. It was housed in a pit dug into the natural soil, the base of which was 3 m under the present day ground surface.

The burial was found lying among the wagon remains at the E side of the chamber, orientated (head)N-S(feet) (Fig. 162; the numbers in square brackets refer to the numbers on the plan). Anthropological study of the skull indicated that it was a female

skeleton, about 30 years old. By the skull of the burial was a beautiful gold torc [50] (Joffroy 1958, pl. 5). The burial was also provided with a necklace of amber and diorite beads [41–49] (*ibid.* 87, fig. 18, 10–18), a pair of schist bracelets [32], a pair of bronze sheet bracelets covered with amber beads [33] (*ibid.* 87, fig. 18, 9), a hollow bronze waist-ring, 270 mm in diameter [31] (*ibid.* 87, fig. 18, 8), a pair of hollow bronze ankle-rings [30] (*ibid.* 87, fig. 18, 7), and eight fibulae [23–40] (*ibid.* 87, fig. 18, 1–6). The W side of the chamber was occupied by bronze vessels, comprising the famous bronze crater [1] (*ibid.* pl. 6), the bronze lid of which had a female bronze statuette standing on its omphalos (*ibid.* pls 7–8), a bronze trefoil-mouthed *oinochoe* [5] (*ibid.* 101, fig. 19), a silver phiale with gilded omphalos [2] (*ibid.* 102, fig. 20), an attic black-figured 'Droop Cup' [3] (*ibid.* 102, fig. 21, upper), a greek black painted cup [4] (*ibid.* 102, fig. 21, lower), two handled bronze basins [6–7] (*ibid.* 103, fig. 22, upper) and one large bronze basin without handles [8] (*ibid.* 103, fig. 22, lower). Between the bronze vessels and the wagon remains were a bronze terminal [51] (*ibid.* 87, fig. 18,9), three small bronze rings, 15 mm in diameter [52] (*ibid.* 87, fig. 18, 20) and two bronze 'beads' [25] (*ibid.* 87, fig. 18, 21).

The wagon fittings from this grave have recently been published by M. Egg and A. France-Lanord (1987). Egg and France-Lanord were able to uncover important new information about the wagon, which allowed them to put forward a complete reconstruction. Full details of the wagon are available in their publication, only the most important wagon finds will be introduced here.

The four wheels of the wagon were leant against the E wall of the chamber [9,10]. They were 745 mm in diameter, and fitted with type VII tyres 30 mm wide. The tyres each had 10 nails, set 230 mm apart, which had countersunk heads. The ends of the tyre nails were bent over, showing a felloe height of 55 mm. Each felloe had a bronze clamp, the sides of which had two rectangular windows surrounded by a raised rib [29] (Pl. 21, 6). The wheels had 10 spokes which were fitted into the felloe between the tyre nails. The spokes were 220 mm long and had a diameter of 32–35 mm at their base. The bases of the spokes were fitted with a ribbed bronze sheet cuff, above which was a second bronze sheet cuff with one side serrated with long triangular teeth (Pl. 21, 3–5).

The naves were 282 mm long, each with six bronze sheet fittings and two iron nave-caps with an axle-channel 50 mm in diameter (Pl. 20B). Each side of the nave had bronze sheet covers for the nave-head, nave-neck, and nave-stock. The nave-head cover had two groups of three ribs; both the nave-neck and nave-stock covers had a single group of three ribs. The nave-stock was covered by two bronze sheets, each of which had 10 semicircular openings on the inner side, to accommodate the circular spoke ends. Four axle-caps were found in a pile in the SE corner of the wagon-box [11] (Pl. 21, 1); they were decorated with ribs in a similar way to the nave fittings and had a flat circular flange with the same diameter as the nave-head (ca. 130 mm). The axle-caps were fitted with small crescent-headed linchpins [27] (Pl. 21, 2). Among the axle-caps in the SE corner of the wagon-box was a pair of smaller axle-caps [28] from the pole axle (Pl. 21, 7).

Among the wagon parts was a long iron object orientated N-S [19]. It was rectangular in cross-section (9 × 25 mm) and 1.34 m long (Pl. 22, 7). The middle of the iron object was perforated by an iron rod with a decorated spherical head. Below this rod was a slightly conical iron sheet fitting, ca. 50 mm in diameter and 80 mm long. Each end of the rod was provided with iron tongue-shaped attachments, each apparently with a long iron rivet.

At the S end of the wagon-box were about 20 cylindrical

bronze fittings (27 mm in diameter and 16–24 mm long), arranged in a row; the internal diameter of these fittings corresponds to the internal diameter of the small axle-caps [15] and they could have decorated the draught pole axle (Pl. 21, 8). At the E side of the wagon fittings were two bronze profiled knobs [23.24], one of which had a curved piece of bronze sheet 80 mm in diameter and an iron nail bearing complicated wood remains (Pl. 23, 3).

At the N and S ends of the group of wagon fittings were a number of cylindrical bronze sheet fittings. Joffroy stated that these are not located accurately on the plan, because they were uncovered in a very fragmentary condition [16]. They were of two types: 1) four rings, 125 mm in diameter and 29 mm wide, decorated with three raised ribs (pl. 22,2); 2) four rings, 125 mm in diameter and 65 mm wide, with four raised ribs (Pl. 22, 1). The restoration of these pieces by the RGZM, Mainz, showed that both types of bronze ring were not closed, but definitely 'C'-shaped in cross-section, and the wider rings were perforated by a thick iron bolt terminated by a ring; Dr M. Egg suggests that they were axle fittings. Further bronze rings had the same diameter as the small axle-caps (Pl. 21, 9–11). These rings could have been fitted to the cylindrical draught pole axle. If so, they would obviously be positioned at the front end of the wagon. Sadly, the rings do not seem to be located precisely on the grave plan and so it is by no means certain which was the front end of the box. The 20 small bronze rings mentioned above (Pl. 21, 8) could come from the draught pole axle, and might suggest that the front end of the wagon was orientated to the S.

Each side of the box was decorated with seven bronze openwork decorative plaques [12] (Pl. 23, 14–15), alternating with seven hollow bronze balusters [13]. All the balusters were hollow, and housed an iron rod. Twelve of the balusters had a thickening at only one end (Pl. 23, 11), but the pair at the S end of the box had thickenings at both ends, and a slit-shaped opening on one side (Pl. 23, 12). The top of the long sides of the wagon-box was presumably formed by a wooden rod.

The S end of the box was differently constructed [17], framed by three bronze components (Pl. 23, 1.2.4). According to the mountings, this end of the box was 184 mm high and 585 mm wide. It was decorated with three rosette-shaped bronze sheet ornaments [18] (Pl. 23, 5), and a large number of bronze nails (Pl. 23, 6–10). The upper surface of the side mountings had holes (Pl. 23, 1) and may have held the balusters with slit-shaped openings which, according to Joffroy, contained traces of leather on their iron rods. Joffroy thought that a leather strap was stretched between the two balusters, the leather strap being adorned with an embossed bronze sheet [14].

The N end of the box seems to have been decorated with three wheel-shaped openwork bronze plaques similar to those decorating the long sides (Pl. 23, 16). This end of the box may have been fitted with two pieces of bronze sheet, 372 mm long. One of the pieces of bronze sheet had concave longitudinal sides, the other piece had one straight side and one convex side. Both pieces of bronze sheet bore embossed decoration. Also at the N end of the box were four bronze phalerae decorated with concentric circular ribs [21.22]. It is not certain whether they belonged to the wagon, the horse-gear or to some other object.

Among the wagon remains were four bent iron rods [20]. According to Dr Egg, the rods were ca. 313 mm long, both ends having a thickening and a rectangular tenon 40 mm long (Pl. 22, 3–6).

The wagon fittings were surrounded by small bronze knobs of two sizes [26]: some 40 mm in diameter, the others smaller and provided with a hook. Joffroy thought that these were fastened to the border of a textile cover for the wagon. Dr Egg suggests

that the bronze phalerae with concentric ribs may also have decorated the cover.

Comments: The wagon finds from Vix have recently been restored, and were published in detail by M. Egg and A. France-Lanord.

Dr Egg suggests that the 1.35 m long iron object (Pl. 22, 7) sat on the wagon's perch, implying that the wagon-box, additionally supported by the four sinuous iron rods, was raised above the level of the axles. This suggestion is reinforced by the plan of the wagon finds, on which it seems that the axle or pole fittings remained *in situ*, whereas the box fittings (balustrades, construction at S end etc.) seem to have fallen to the E when the wagon or chamber collapsed. The W balustrade of the box, however, obviously broke in half, and the N part apparently remained in its original position.

Museum: Musée de la Société Archéologique et Historique du Châtillonnais, Châtillon-sur-Scine.

3 SWITZERLAND

18 Adiswil

(Gemeinde Gunzwil, Amt Sursee, Kanton Luzern)

References: Geßner 1948; Drack 1958a, 57–8; Schmid-Sikimić 1984.

Description: This erased tumulus was partly destroyed by building work in 1933. B. Schmid-Sikimić has recently described the grave finds in detail, and argued convincingly that they represent an inhumation orientated (head)N-S(feet) lying among the remains of a four-wheeled wagon positioned with the same orientation. Only iron tyres have survived from the wagon (Drack 1958a, 21, fig. 17, 20). They are of type VII, having a width of about 30 mm and a diameter of about 710 mm. The tyres were fitted with nails with large square heads spaced 95–125 mm apart. The inhumation was buried with a bronze situla and provided with rich jewellery: nine large agate pin-heads, two bronze leg-rings, one lignite bracelet, one amber bead, seven small gold rings and remnants of a gold collier or neck-ring.

Museum: Schlossmuseum, Beromünster.

19 Allenlütten

(Gemeinde Mühleberg, Amt Laupen, Kanton Bern)

References: Jahn 1870; Drack 1958a, 58; *ibid.* 1958b, 1–2.

Description: After this tumulus, called the 'Unghürhubel' (diameter ca. 28 m, height ca. 8 m), was partially destroyed by farmers, it was excavated in 1847 by A. Jahn and again in 1869 by E. von Fellenberg. The farmers found a bronze belt-sheet, a gold neck-ring and a gold arm-band (Drack 1958b, pls 1, 1–3; A, 2–3), which may originally have belonged to the same grave as the wagon, discovered later by von Fellenberg in the eastern part of the tumulus. The wagon finds included tyre fragments of type VII, ca. 34 mm wide (*ibid.* pl. 1, 11), a fragmentary iron axle-cap of type Wellenburg (Fig. 72, 8; Drack 1958b, 3, fig. 2) and remains of iron nave fittings of type Cannstatt (Pl. 24A). A. Jahn also illustrated iron fragments which could represent wagon-box fittings of type v (Jahn 1870, pl. 3, 7–8). The tumulus contained further finds from earlier cremation and inhumation burials.

Museum: Bernisches Historisches Museum, Bern.

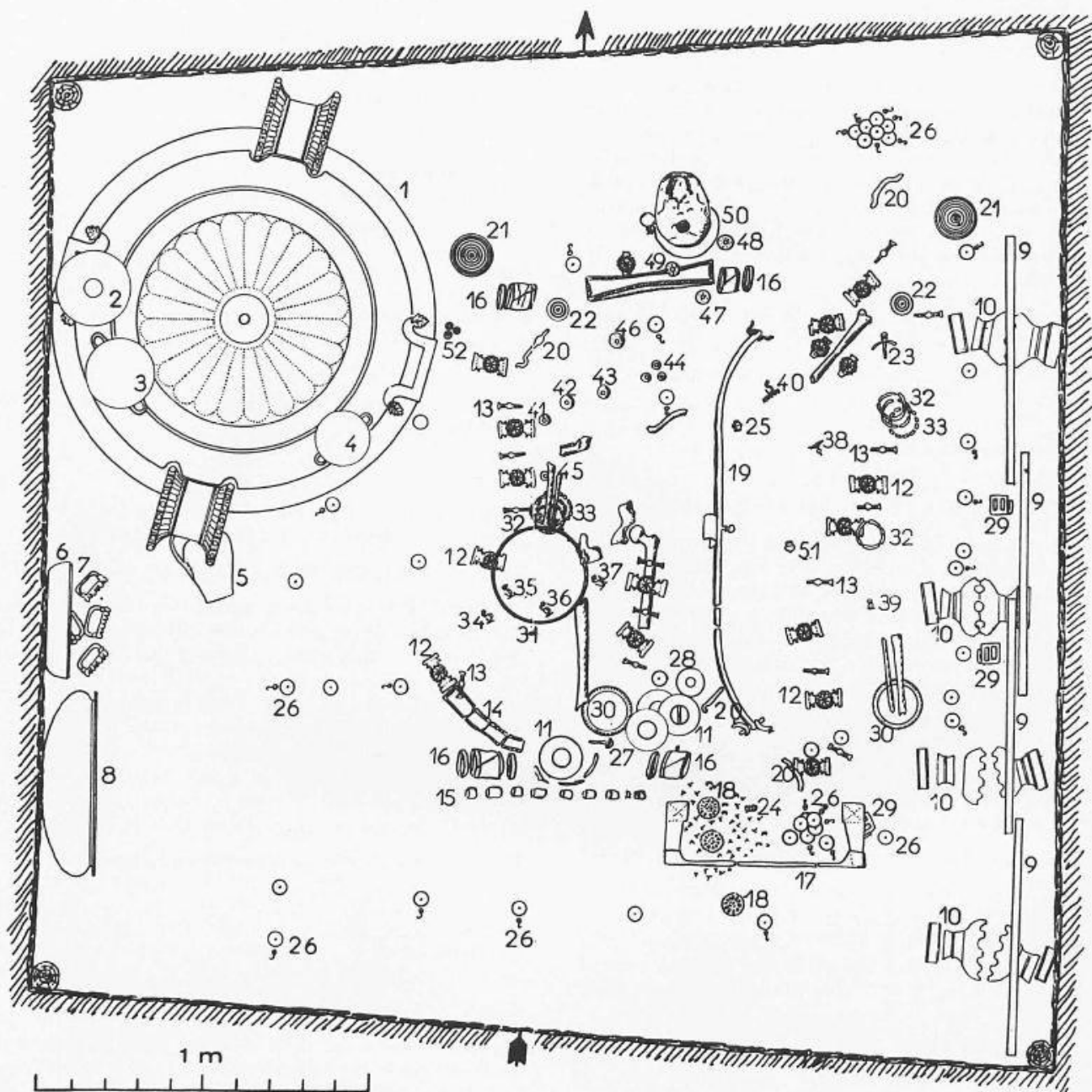


Fig. 162 Vix, plan of the grave chamber (after Joffroy 1958). — Scale 1:20.

20 Birmenstorf

(Bezirk Baden, Kanton Aargau)

References: Forrer 1921b; Drack 1958a, 58.

Description: This grave was discovered by a forester in 1860. The fact that the surviving objects are all bronze raises the suspicion that he may have discarded further iron or pottery grave goods. The wagon fittings comprised: two terminals (Pl. 24B, 1), two 'L'-shaped angle-sockets with octagonal cross-section (Pl. 24B, 2–3), two fragments of bronze sheet possibly from nave fittings of type Ins (Pl. 24B, 8–9), six fragments of wagon-box ornaments with two rows of bosses (Pl. 24B, 4) and seven wagon-box ornaments with three rows of bosses (Pl. 24B, 5). The finds also included 12 rhomboidal rein-knobs (Pl. 24B, 6–7), one trilobate rein-knob (Forrer 1921b, fig. 5), two large and 14 smaller rings

(ibid. figs 2–3.8) and fragments of bronze vessels (Drack 1977, 115, fig. 15, 1–2).

Museum: Schweizerisches Landesmuseum, Zürich.

21 Chabrey

(Bezirk Avenches, Kanton Waadt)

References: Drack 1958a, 58; ibid. 1964, 44.

Description: In 1872 G. de Bonstetten excavated four tumuli in the 'Bois Rosset'. He found 'ashes, charcoal, remnants of pottery vessels and iron fragments'. The iron fragments included a piece of iron tyre, ca. 23 mm wide, of type IID (Drack 1964, pl. 20, 1).

Museum: Bernisches Historisches Museum, Bern.

22 Châtonnaye

(Bezirk Glâne, Kanton Freiburg)

References: Drack 1958a, 58–9; *ibid.* 1964, 4–5.

Description: This tumulus was destroyed by agricultural activities in 1880. In the tumulus, under a stone core, the farmers found 16 tyre fragments (Drack 1964, pl. 2, 1), an iron nave-cap (*ibid.* pl. 2, 2), an iron neck-ring covered with gold sheet (*ibid.* pl. 1, 12), a gold bracelet (*ibid.* pl. 1, 13), a gold ear-ring (*ibid.* pl. 1, 11), an agate bracelet (*ibid.* pl. 1, 10), a dagger chape (*ibid.* pl. 1, 14), a bronze fibula (*ibid.* pl. 1, 9) and remnants of a bronze vessel. The tyres were of type VIID and measured ca. 31 mm in width.

Comments: Presumably the dagger, bronze vessel and gold jewellery belonged to a rich wagon-grave.

Museum: Museum für Kunst und Geschichte, Freiburg.

23 Cordast, tumulus 18

(Bezirk See, Kanton Freiburg)

References: Drack 1958a, 59; *ibid.* 1964, 6ff.; Schwab 1976, 16ff.

Description: Tumulus 18 was the largest in a group of about 27 tumuli, which were excavated in 1894 and 1895 by M. de Diesbach. The finds comprised iron tyres (Drack 1964, 13, fig. 13), an iron axle-cap fragment (external diameter ca. 95 mm, internal diameter ca. 50 mm; Schwab 1976, 18, fig. 5, 18), iron fragments and pottery sherds. The axle-cap fragment can probably be assigned to the Wellenburg type.

Museum: Museum für Kunst und Geschichte, Freiburg.

24 Diemerswil

(Amt Fraubrunnen, Kanton Bern)

References: Drack 1958a, 59; *ibid.* 1959, 6.

Description: This tumulus had already been plundered before the excavation by J. Uhlmann in 1855 (for a sketch of the tumulus see Drack 1958a, 3, fig. 2). Apart from remains of a cremation burial, Uhlmann discovered iron tyre fragments of type VIID, measuring 27–30 mm in width (Drack 1959, pl. 4, 10–12).

Museum: Bernisches Historisches Museum, Bern.

25 Düringen 'Birchwald', tumulus I

(Bezirk Sense, Kanton Freiburg)

References: Drack 1958a, 59; *ibid.* 1964, 18–19; Schwab 1976, 24ff.

Description: This tumulus was partially destroyed by the landowner and subsequently excavated by G. de Bonstetten in 1865. In 1969 the tumulus was examined for a second time, and further fragments of the same objects found by de Bonstetten came to light. The tumulus contained a stone core and the following objects: iron tyres (Schwab 1976, 28, fig. 22), a fragmentary iron neck-ring covered with gold sheet, a fragmentary iron arm-ring covered with gold sheet, a bronze belt-sheet covered with gold sheet, a bronze drum fibula covered with gold sheet, a bronze cauldron, three bronze bracelets, three lignite bracelets and various spiral arm-rings (Drack 1964, pls 6–7; Schwab 1976, 28, fig. 22). The iron tyres are of type VIID and measure about 29 mm in width.

Comments: The finds from this tumulus probably came from more than one burial. However the gold-covered bracelet, neck-ring, belt-sheet and fibula, and the bronze cauldron, may have come from a rich wagon-grave.

Museum: Bernisches Historisches Museum, Bern.

26 Fraubrunnen

(Amt Fraubrunnen, Kanton Bern)

References: Drack 1958a, 59; *ibid.* 1959, 7–8.

Description: This tumulus was opened by J. Keiser in 1877. He found iron tyres (Drack 1959, pl. 5, 16), a bronze vessel and bronze and iron remnants. Only the tyres were preserved: these are of type VID, measuring 26 mm in width and ca. 720 mm in diameter.

Museum: Sammlung des Rittervereins Burgdorf, Schloß Burgdorf.

27 Grächwil

(Gemeinde Meikirch, Amt Fraubrunnen, Kanton Bern)

References: Jahn 1852; Drack 1958a, 59–60; *ibid.* 1959, 8ff.

Description: This tumulus was excavated in 1851 and measured about 31 m in diameter with a height of about 5.5 m. At the base of the tumulus was a primary cremation burial with a pottery vessel (Drack 1959, 12, fig. 9). At least 1 m above this the tumulus contained a secondary burial furnished with a wagon, iron fragments and the famous bronze Hydria (Drack 1959, pls A–E). The wagon fittings included iron tyres of type VIE, width ca. 27 mm, and simple iron nave-caps (Jahn 1852, pl. 2, 4–5; Drack 1959, pl. 7, 4). Further secondary graves contained bronze fibulae and arm-rings (Drack 1959, pl. 7, 5–8).

Museum: Bernisches Historisches Museum, Bern.

28 Hermrigen

(Amt Nidau, Kanton Bern)

References: Drack 1958a, 60; *ibid.* 1958b, 5–6.

Description: According to a catalogue entry, a collection of wagon fittings in the Museum Schwab came from excavations by E. F. Müller in a tumulus near Hermrigen, probably in 1849. The finds comprise tyre fragments of type VID, ca. 24–25 mm wide (Drack 1958b, pl. 4, 22–4), nave-caps of type Grandvillars (*ibid.* pl. 4, 16) and domed axle-caps (*ibid.* pl. 4, 17). However W. Drack suspects that the wagon fittings came from Müller's excavations at Ins, presumably belonging with the linchpins which were found there (see cat. no. 29E). Because the wagon fittings in the Museum Schwab include two different types of nave fittings (type Grandvillars and 'simple iron nave-caps'), presumably from two different wagons, it seems probable that Müller's wagon finds from Hermrigen and Ins became mixed together (compare Drack 1958b, pl. 4, 16–17 with pl. 4, 18).

C. Dunning, from the Museum Schwab, has recently discovered more information about Müller's excavations at Hermrigen. In all, he opened five tumuli, of which tumulus 1, 1 m high and 13 m in diameter, was the most important. The central grave contained a wagon, a bronze cauldron and gold jewellery. Tumulus 1 also housed two secondary graves: the first had a simple bronze neck-ring, bracelets and hollow ear-rings;

the second had a bronze belt-sheet, a lignite arm-band and a drum fibula.

Museum: Museum Schwab, Biel.

29A Ins, tumulus II of 1848

(Amt Erlach, Kanton Bern)

References: Drack 1958a, 60ff.; *ibid.* 1958b, 8–9.

Description: Baron G. de Bonstetten excavated this tumulus in 1848. At a depth of 6 ft., probably on the base of the tumulus, he found iron tyres, two iron rings and pottery sherds. Of these finds, only an iron ring has been preserved (Drack 1958b, pl. 5, 11). Secondary graves, higher in the tumulus, contained a fibula, a bracelet and bronze pendants (*ibid.* pl. 5, 12–15).

Museum: The surviving finds from de Bonstetten's excavations are housed in the Bernisches Historisches Museum, Bern.

29B Ins, tumulus VI of 1848, lower grave

(Amt Erlach, Kanton Bern)

References: Drack 1958a, 60ff.; *ibid.* 1958b, 10ff.

Description: Roughly at the base of this tumulus, under an 'immense' stone core, Baron G. de Bonstetten, in his excavation of 1848, found an inhumation burial with rich goods including a wagon, a gold chain and a gold bead with decoration in granulation (Drack 1958b, pl. B, 3), a bronze crescent-shaped razor (*ibid.* pl. 14, 107) and horse-gear comprising a yoke, fragments of an iron bit and bronze rein-knobs (Fig. 102, 12–13; Drack 1958b pls 9, 53–4; 11, 89–91; 12; 13; 14, 108; for the yoke, see also Osterwalder and Breitenbach 1980, 87, fig. 8). The wagon fittings include bronze and iron nave fittings of type Ins (Pl. 24C), iron tyres of type IID, 24 mm wide (Drack 1958b, pl. 7, 46–7), bronze spoke sleeves (*ibid.* pl. 8, 48–50), a pair of bronze and iron terminals (*ibid.* pl. 14, 112–3), an iron and bronze socketed attachment (*ibid.* pl. 14, 114), bronze wagon-box ornaments (Pl. 25) and remnants of an iron linchpin (Drack 1958b, pl. 14, 109–110).

Museum: Bernisches Historisches Museum, Bern.

29C Ins, tumulus VI of 1848, upper grave

(Amt Erlach, Kanton Bern)

References: Drack 1958a, 60ff.; *ibid.* 1958b, 10ff.

Description: De Bonstetten found a secondary wagon-grave in tumulus VI, some distance above the primary burial discussed above (cat. no. 29B). The secondary grave contained an inhumation burial and four iron tyres of type VIID (ca. 30 mm wide), simple iron nave-caps, iron rings and an iron sword in a bronze scabbard (Drack 1958b, pls 7, 41–4.115–6; 14, 117).

Museum: Bernisches Historisches Museum, Bern.

29D Ins, tumulus VIII of 1848

(Amt Erlach, Kanton Bern)

References: Drack 1958a, 60ff.; 1958b, 12–14.

Description: Some distance above a primary inhumation grave, this tumulus contained a second rich inhumation burial. Apart from the wagon, the grave goods comprised a bronze situla, a gold ear-ring, 17 embossed gold sheet fragments and two finely

decorated circular gold objects (Drack 1958b, 13, fig. 5, b; 13, fig. 6; 14, fig. 7; pls 8, 122–4; B, 2; C). The embossed gold sheet fragments are similar to the gold sheet ornaments from the wagon-graves of Hochdorf and Augsburg-Wellenburg (see Osterwalder and Brietenbach 1980, 84, fig. 2). The wagon finds are lost but apparently included remains of two wheels.

Museum: Bernisches Historisches Museum, Bern.

29E Ins, tumulus II of 1849

(Amt Erlach, Kanton Bern)

References: Drack 1958a, 60ff.; *ibid.* 1958b, 15–17.

Description: E. F. Müller excavated four tumuli in 1849. Among the finds from tumulus II were three linchpins (Drack 1958b, pl. 4, 19–21) and iron tyres. W. Drack suspects that some of the nave and tyre fittings in the Museum Schwab, which supposedly came from Hermrigen, in fact came from E. F. Müller's excavation of this tumulus (see cat. no. 28; Drack 1958b, pl. 4, 16–8.22–4).

C. Dunning, of the Museum Schwab, has located some more details about the wagon-grave. Apparently the grave goods included a large openwork bronze disc, a lignite bracelet, a bronze barrel-shaped arm-band, a simple bronze neck-ring and some fine bronze bracelets. This set of ornaments suggests a female burial of Ha D1.

Museum: Museum Schwab, Biel.

29F Ins, tumulus IV of 1908

(Amt Erlach, Kanton Bern)

References: Drack 1958a, 60ff.; *ibid.* 1958b, 17–9.

Description: In his excavation of 1908, J. Heierli uncovered a wagon-grave at the base of this tumulus. The grave was covered by a stone core and contained remains of two wheels, iron fragments and probably pottery vessels. These finds have mostly been lost, but C. Dunning, from the Museum Schwab, has located an iron semi-lunate razor from the central grave. The tumulus also contained seven or eight secondary inhumation burials with bronze grave goods.

Museum: The finds were apparently given to the Museum Schwab, Biel, but are now lost.

30 Jegenstorf, tumulus I

(Amt Fraubrunnen, Kanton Bern)

References: Drack 1958a, 62; *ibid.* 1959, 16–7.

Description: This tumulus was excavated in 1847 by A. Jahn. He found an inhumation burial along with iron tyres and nave fittings, an iron chain, an iron dagger or daggers and a pottery vessel. J. Wiedmer-Stern re-excavated the tumulus in 1907 and found more tyres and nave fittings and apparently also an iron linchpin. The finds from both excavations are lost.

31 Payerne

(Bezirk Payerne, Kanton Waadt)

References: Drack 1958a, 63; *ibid.* 1964, 51–2.

Description: A. Naef excavated this large tumulus between 1898 and 1905. Under the central stone core was an inhumation burial with jewellery including a drum fibula (Drack 1964, pl.

23, 5). To the south of the stone core were remains of a cremation burial, a gold neck-ring (*ibid.* pls 23, 8; A, 1) and wagon finds. The wagon finds comprised iron tyres and nave fittings and bronze wagon-box decoration. The wagon finds are lost.

Comments: On the schematic plan published by W. Drack (1958a, 4, fig. 3) the wagon finds seem to be scattered widely in the tumulus, suggesting that the wagon-grave was disturbed – possibly by later inhumation burials.

Museum: Musée Cantonal d'Archéologie et d'Histoire, Lausanne.

32 Rances

(Bezirk Orbe, Kanton Waadt)

References: Drack 1958a, 63; *ibid.* 1964, 52f.

Description: This tumulus was destroyed by farmers in 1850. However, the findings were recorded by F. Troyon. The finds came from an inhumation in the stone core of the tumulus and comprised wagon fittings, a bronze cauldron (Drack 1964, pl. 24, 1), an iron dagger with antenna hilt (*ibid.* pl. 24, 4) and a bronze belt-sheet (*ibid.* pls 24, 5; F, 2). The wagon fittings included rather atypical iron tyres (? type VID) and simple iron nave-caps (*ibid.* pl. 24, 2–3; 1958a, 20, fig. 16, 1). Some wagon fittings illustrated by P. Bial (1862, pl. 2, 8–11) may have come from this tumulus.

Museum: Musée Cantonal d'Archéologie et d'Histoire, Lausanne.

33 Unterlunkhofen, tumulus 63

(Bezirk Bremgarten, Kanton Aargau)

References: Keller 1882; Heierli 1906, 93–5; Drack 1958a, 63.

Description: This was the largest tumulus in a cemetery of 63 tumuli, measuring 25–30 m in diameter with an original height of about 5 m. After a first excavation in 1866, J. Heierli examined the tumulus again in 1899. The wagon finds were possibly associated with an inhumation burial provided with three bronze neck-rings, a drum fibula, a bronze belt-sheet, textile remains with bronze beads and some pins and arm-rings (for illustrations of some of these objects see Keller 1882, pl. 5, 5.6.8). The tyre fragments have been illustrated by W. Drack: 1958a, 21, fig. 17, 21–2.

Museum: Schweizerisches Landesmuseum, Zürich.

34 Urtenen

(Amt Bern, Kanton Bern)

References: Drack 1958a, 63–4; *ibid.* 1959, 26ff.

Description: This tumulus was first opened in 1857, and then excavated again in 1908 by J. Wiedmer-Stern. The finds seem to have accompanied an inhumation burial within the stone core of the tumulus. Apart from the wagon finds, comprising iron tyres of type VI (25–30 mm wide) and simple iron nave-caps, the grave goods included a bronze ribbed bucket, 30 gold sheet hemispheres from large pin-heads, one gold car-ring, four lignite bracelets and pottery vessels (Drack 1959, pls 14; K; L).

Museum: Bernisches Historisches Museum, Bern

35 Vuiteboeuf

(Bezirk Orbe, Kanton Waadt)

References: Drack 1958a, 64; *ibid.* 1964, 57.

Description: This tumulus was excavated by F. Troyon, who uncovered a stone core covering a grave with iron fragments, part of a lignite arm-band and pottery sherds. The iron fragments were later identified as wagon fittings. The finds from this tumulus are all lost.

36 Wohlen, tumulus I

(Bezirk Bremgarten, Kanton Aargau)

References: Drack 1958a, 64.

Description: Among the finds from this large tumulus is an iron draught pole axle-cap related to the Wellenburg type (Fig. 72, 16). It is uncertain whether the axle-cap came from a destroyed wagon-grave, or alternatively from the modest inhumation grave 3.

Museum: Sammlung der historischen Gesellschaft Freiamt, Wohlen.

4 MIDDLE RHINE

37A Bassenheim, tumulus 8a of 1939, grave 1

(Kreis Koblenz, Reg.-Bez. Rheinland-Pfalz)

References: Haffner 1976, 404.

Description: Tumulus 8a was built over an earlier tumulus and measured 28 m in diameter with a height of 1.6 m. In the middle of the tumulus was a rectangular grave pit measuring 3.5 × 2 m, with four slots for the wheels of a four-wheeled wagon. The wagon must have been positioned E-W. No remains of the wagon were preserved; the grave only contained two pottery vessels.

Museum: Rheinisches Landesmuseum, Bonn.

37B Bassenheim, tumulus 3 of 1968

(Kreis Koblenz, Reg.-Bez. Rheinland-Pfalz)

References: Haffner 1976, 404.

Description: Tumulus 3 had a grave chamber, orientated W-E, measuring 3.2 × 2.8 m. The floor of the grave had slots for the wheels of a four-wheeled wagon. The grave did not contain any finds.

37C Bassenheim, tumulus 1 of 1969

(Kreis Koblenz, Reg.-Bez. Rheinland-Pfalz)

References: Haffner 1976, 404.

Description: This tumulus had a grave chamber, orientated W-E, measuring 3.2 × 2 m. The floor of the grave had slots for the wheels of a four-wheeled wagon. The finds comprised one pottery vessel and iron fragments from the wagon.

Present location: Staatliches Amt für Vor- und Frühgeschichte, Koblenz.

38 Bell, tumulus 1

(Kreis Simmern, Reg.-Bez. Rheinland-Pfalz)

References: Rest 1948; Joachim 1987.

Description: The wagon from Bell has recently been studied in detail by H.-E. Joachim, who also offered a reconstruction of the finds (Joachim 1987, 138–9). Tumulus 1 was the largest tumulus in the cemetery, measuring 22 m in diameter and 1 m in height. The primary burial was housed in a wooden grave chamber measuring 1.8 × 2.5 m. The floor of the grave had four slots for the wheels of the four-wheeled wagon (Rest 1948, 135, fig. 2). The finds included four iron tyres of type VII, four felloe-clamps, four iron rods with cast bronze terminals (Fig. 78, 1), eight iron nave-caps of type Grandvillars, a 'Y'-shaped arrangement of iron rods from the undercarriage, four looped iron rods from the corners of the wagon-box, 25 decorative bronze nails, an iron spearhead and a bronze situla (Rest 1948, 138–41, figs 3–6). According to the position of the wagon fittings on the grave floor, the naves were 400 mm long and measured 150 mm in diameter. The felloe-clamps indicate that the wooden felloes were 75 mm wide. A study of the surviving wooden remains showed that at least three different sorts of wood had been used in the wagon construction: elm for the naves, maple for the perch and ash for the felloes and wagon-box. For further details of the wagon finds see Joachim (1987).

Museum: Rheinisches Landesmuseum, Bonn.**39 Hennweiler, tumulus 1**

(Kreis Kreuznach, Reg.-Bez. Rheinland-Pfalz)

References: Dehn 1941, part 2, 41–2.

Description: The primary wagon-grave of tumulus 1 was covered by a stone packing. It contained iron tyre fragments of type VII (ca. 35 mm wide and with large nail heads), probably from two wheels (Dehn 1941, part 1, 89, fig. 51, 5), two iron rods with cast spherical bronze knobs (ibid. fig. 51, 2–3), two iron nails with cast bronze terminals (ibid. fig. 51, 1), two iron rods with cast bronze terminals (Fig. 78, 2), two further bronze knobs and a perforated disc 150 mm in diameter (possibly a nave-cap).

Museum: Rheinisches Landesmuseum, Bonn.**40A Hundheim, tumulus 1**

(Kreis Bernkastel, Reg.-Bez. Rheinland-Pfalz)

References: Haffner 1976, 188–90.

Description: In the middle of this tumulus was a stone grave chamber measuring 3.5 × 2.3 m and orientated WSW-ENE (Haffner 1976, 191, fig. 41). At the west end of the chamber were the remains of a two-wheeled vehicle, with iron tyres of type VIIID (diameter ca. 0.92 m) and simple iron nave rings (ibid. pl. 5, 1–3). East of the wheels were an iron pin and a bronze situla (ibid. pl. 5, 4–5). Judging from the position of the grave finds, the wheel gauge of the vehicle was 1.35 m.

Museum: Landesmuseum, Trier.**40B Hundheim, tumulus 2, grave 1**

(Kreis Bernkastel, Reg.-Bez. Rheinland-Pfalz)

References: Haffner 1976, 190–3.

Description: In the middle of the tumulus was a rectangular grave pit measuring 2.8 × 1.9 m, orientated NNW-SSE (Haffner

1976, 192, fig. 43). At the N end of the grave were two iron tyres of type VID (diameter ca. 0.90 m) and simple iron nave rings; between the wheels and further to the S were more iron fragments (ibid. 193, fig. 44). The grave also contained a bronze arm-ring, three iron arrowheads, an iron spearhead and an iron spear ferrule (ibid. pl. 5, 6–11). Judging from the position of the grave finds, the wheel gauge of the vehicle was ca. 1.35 m.

Museum: Landesmuseum, Trier.**41 No grave allocated.****42 Niederweiler**

(Kreis Zell, Reg.-Bez. Rheinland-Pfalz)

References: Lehner 1927, 267–9; Driehaus 1966b, 37–8; Joachim 1981.

Description: This tumulus (diameter 15 m, height 0.5 m) had already been plundered before its excavation in 1926. The central grave contained remains of iron nave fittings of type Cannstatt, three iron axle-caps of type Wellenburg (Fig. 72, 9), iron tyres of type VII, a bronze cauldron, an iron spearhead and two pottery vessels. For illustrations of the finds see: Joachim 1981, 13, fig. 2; 15, fig. 4, 1–6; Driehaus 1966b, 39, fig. 4, 3–7.

Museum: Rheinisches Landesmuseum, Bonn.**43 Oberlahnstein, tumulus 3, grave 2**

(Loreleykreis, Reg.-Bez. Rheinland-Pfalz)

References: Schumacher 1917, 188; Joachim 1977, 86–8.

Description: The primary grave in this tumulus was a cremation burial. Above this was an inhumation in a rectangular stone grave chamber measuring 3.5 × 3.8 m. The latter grave contained two iron tyres of type VII (width 30 mm, diameter 0.8 m), four iron nave rings with diameters of 140–160 mm and 160–180 mm, probably from a nave of type Grandvillars, two iron felloe-clamps (Joachim 1977, 81, fig. 35, 8–9), two iron spearheads (Schumacher 1917, pl. 2, 12–13), two iron arrowheads (ibid. pl. 2, 16–18) and a bronze 'Fußzier' fibula with crossbow construction. Apparently the vehicle had a wheel gauge of 1.29 m.

Present location: Staatliches Amt für Vor- und Frühgeschichte, Koblenz.**44 Weilerbach**

(Kreis Kaiserslautern, Reg.-Bez. Rheinland-Pfalz)

References: Engels 1969.

Description: This tumulus, which is located only 800 paces from the famous early La Tène princely grave of Rodenbach, was excavated in 1875 by L. Lindenschmit. The wagon-grave was found under a stone packing, and only contained iron tyres of type VI (width 25 mm) and six nave-caps of type Grandvillars from the four-wheeled wagon (Engels 1969, pls 2, 2–3; 3–8). The tyres were fitted every 120–140 mm with nails which had large round heads. Some of the nails were fully preserved and showed that the wooden felloes were 55 mm wide.

Museum: Historisches Museum der Pfalz, Speyer.

45 Offenbach – Rumpenheim

(Offenbach a. Main, Reg.-Bez. Hessen)

References: Ulrich 1973; Froberg 1974.

Description: This grave was uncovered in 1973 by K. Ulrich. Under a stone packing he found a grave pit containing a grave chamber measuring ca. 3.5 × 2 m (Ulrich 1973, 314, fig. 1). The inhumation burial was positioned (head)SE-NW(feet) and was provided with an iron spearhead with bronze inlaid decoration (ibid. pl. 60), two pottery vessels and an iron knife. From the wagon there remained four iron tyres of type VIIF (Froberg 1974, 145, fig. 1) and iron fittings from four naves (ibid. 146, fig. 2; pls 34–5). The tyres were 35 mm wide and measured 0.86 m in diameter. Each tyre was provided with 18 nails. A careful study of the tyres showed that in three cases they had been hammer-welded together and must have been fitted hot onto the felloe. The fourth tyre had been repaired with a nailed join. The naves were covered with a nave-stock ring with omega-shaped cross-section (diameter 150–170 mm), a slightly conical nave-neck sheathing, and a nave-head ring (width 100 mm, diameter 139 mm). The nave-caps had an axle-channel 65–75 mm in diameter. Surviving wooden remains showed that the naves and felloes were made of ash. The position of the finds indicated that the wagon had a wheel base of 1.8 m and a wheel gauge of 1.3 m. For further information on the wagon finds see Froberg 1974.

Museum: Dreieichmuseum, Offenbach.**46 Schwalbach, tumulus 1**

(Kreis Wetzlar, Reg.-Bez. Hessen)

References: Schoppa 1961, 163–4.

Description: This tumulus measured 20 m in diameter with a height of 1 m. It covered a wooden grave chamber measuring 2.6 × 1.5 m. The burial was probably an inhumation, which was provided with a bronze neck-ring (Schoppa 1961, 167, fig. 6, 2), a pottery vessel (ibid. fig. 6, 1) and a wagon. The vehicle fittings included two iron tyres of type VI or VII, three nave-caps, two nave-stock rings and two felloe-clamps (ibid. 166, fig. 5). The iron nave rings probably indicate a nave construction of Repperndorf type.

Museum: Heimatmuseum, Wetzlar.**5 BADEN-WÜRTTEMBERG****47 Aglasterhausen – Breitenbronn, tumulus in the 'Häldenwald'**

(Neckar-Odenwald-Kreis, Reg.-Bez. Karlsruhe)

References: Anon. 1911; Wagner 1911b, column I; Barthel 1912, 130; Wahle 1928, 179; Nellissen 1975, 186. Unpublished archive material in the Landesdenkmalamt, Karlsruhe.

Description: This tumulus was excavated by Pfarrer Niedderer and Oberförster Steidel in April 1911. Some information concerning the excavation was later collected by E. Wagner, and it is his notes which allow a limited understanding of the excavation. The tumulus was 20 m in diameter and 2 m high. At a depth of 1 m sherds of two large pottery vessels were found, and iron fragments lay to either side. The iron fragments comprised tyres, parts of naves and a knife-blade. According to the excavators, the tyres lay in two long straight lines (measuring 1.10 and 1.30 m in length) and a curved line.

Finds:

- 1) 102 fragments of iron tyres and tyre nails. The tyres vary in width from 20–30 mm and have a cross-section of type II. The nails have globular heads which are sometimes visible on the outer surface of the tyre. The tyre nails often preserve wood grain, which is always horizontal except in one case (Pl. 26, 8). An unpublished drawing by E. Wagner shows a tyre nail 82 mm long; the nail seems too long for a one-layered felloe of type Gottesberg. (Pl. 26, 1–9)
- 2) Four iron sheet fragments with preserved wood grain, possibly felloe-clamps. (Pl. 26, 10.11)
- 3) 47 fragments of iron nave fittings of type Breitenbronn. The nave-head was covered with a profiled cap and a nave-head ring 120 mm in diameter (Pl. 26, 14.15.18.19). The nave-neck was roughly cylindrical, but expanded slightly in a trumpet shape towards the nave-head (Pl. 26, 13.17). The nave-neck sheathing was formed by a single iron band, overlapped and fastened by three iron nails (Pl. 26, 13).
- 4) Iron knife, surviving length 171 mm. (Pl. 26, 16)
- 5) Small iron toggle. (Pl. 26, 12)
- 6) Pottery sherds from at least two vessels, including one vessel published by Nellissen (1975, pl. 2A, 1.2).

Museum: Badisches Landesmuseum, Schloß, Karlsruhe (inv. no. C. 10333–10334).**48 Albstadt – Ebingen, tumulus I of 1932**

(Zollernalbkreis, Reg.-Bez. Tübingen)

References: Paret 1935a, 23; Paret 1935d, 70–1; Breeg 1938, 405–406; Zürn 1987, 211. Unpublished manuscript by H. Breeg in the Heimatmuseum Ebingen.

Description: This tumulus was excavated in 1932 by H. Breeg. It had almost been levelled by agricultural activity but still survived to a height of 500 mm, with a visible diameter of 5 m. The excavators found a stone core 8 m in diameter, covering three inhumation burials. Under the S part of the stone core, at a depth of 0.80–1.0 m, was an inhumation orientated (head)NW-SE(feet). At its feet were two pottery plates and a pottery bowl. Around the skeleton were a number of metal finds including: two fragmentary iron bits, a large iron ring, an iron dagger, two bronze rings, two fragmentary bronze arched fibulae, a cast bronze handle from a bronze cup, some fragments of bronze sheet, some bronze rivets, wagon parts and two pieces of boar's tusks.

Comments: The decorated nave-head ring fragments were never mentioned in the literature and were only restored and recognised as such after the Second World War. Today, they are stored among the finds from tumulus I of the 'Flugplatz' cemetery near Albstadt-Ebingen. It seems probable that these fragments came from Albstadt-Ebingen tumulus I of 1932, and were later, possibly after the war, mixed with finds from the 'Flugplatz' cemetery. Although the nave-head ring does not definitely belong to this grave, it seems very likely because it fits with the other nave fittings to form a nave of type Vilsingen.

An unpublished manuscript by H. Breeg, in the Heimatmuseum Ebingen, contains sketches of some of the grave finds. These have been used here to illustrate lost objects (Pl. 27A, 8.11–14).

Finds:

- 1) 13 fragments of iron tyres of type V, ca. 23 mm wide, with large-headed nails of type C. The nail-heads are rectangular, measuring 34–38 × 18 mm, and are spaced so close

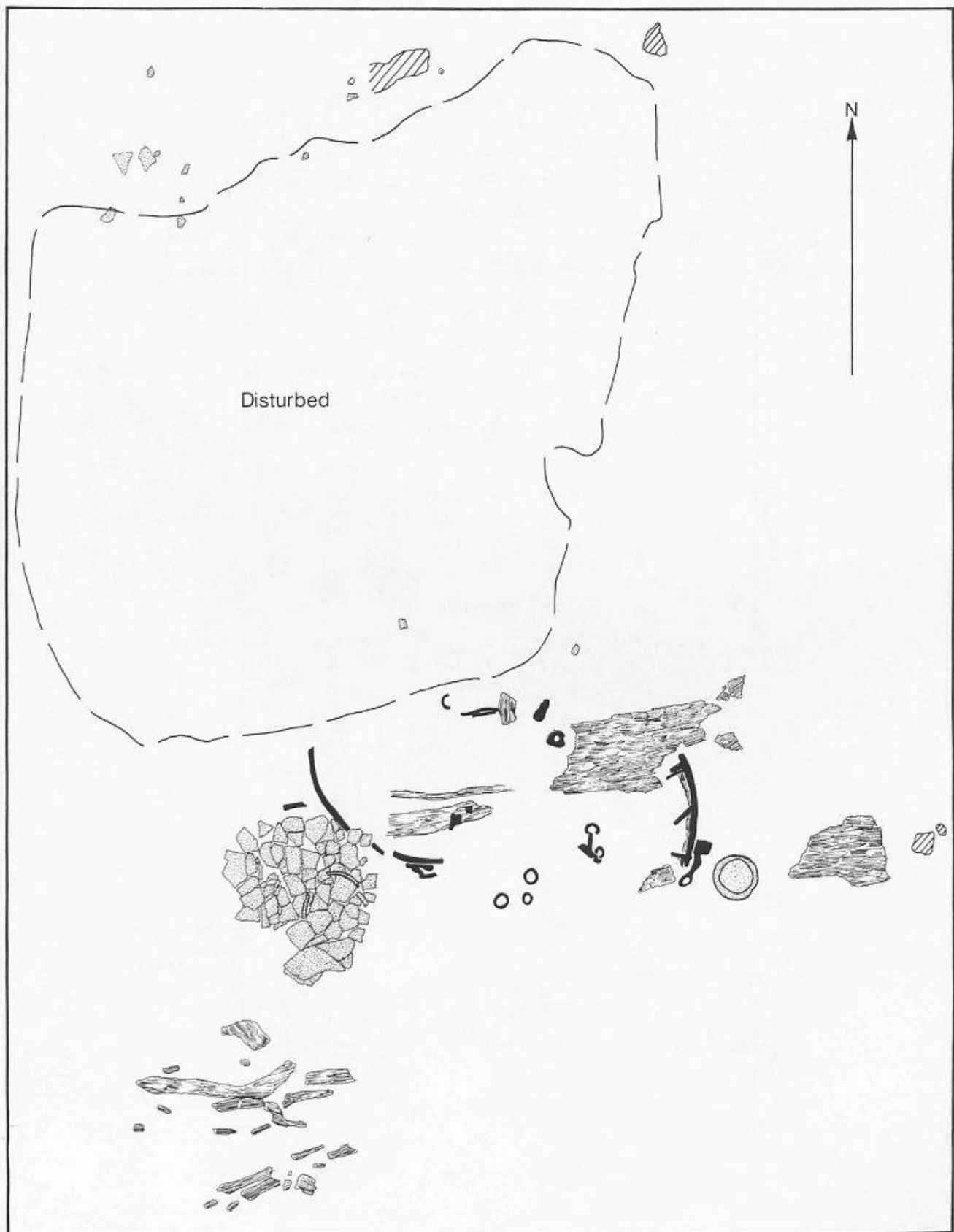


Fig. 163 Albstadt-Truchtlengen, tumulus 11: plan of the remains of the wagon-grave (from an original plan kindly supplied by E. Lieb).
— Scale 1:20.

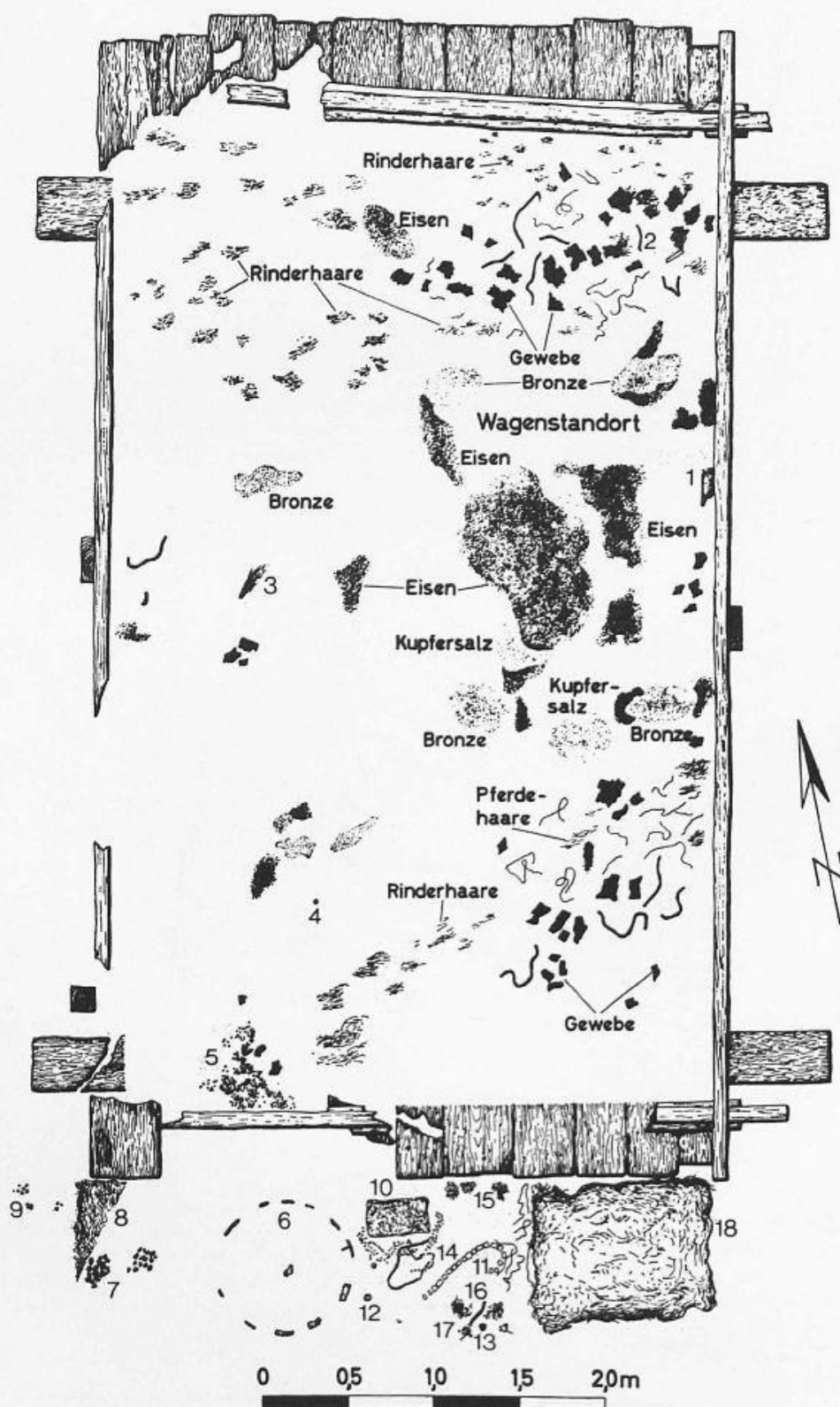


Fig. 164 Altheim-Heiligkreuztal, 'Hohmichele', grave 1: plan of the grave chamber (after Riek and Hundt). — Scale 1:40.

together that they touched each other. One nail shank has horizontal wood grain. The longest surviving nail penetration of the tyre nails is 50 mm. (Pl. 27A, 1.2.4)

- 2) Small fragment of an iron nave-stock ring, semicircular in cross-section. (Pl. 27A, 5)
- 3) Small fragment of iron sheet with 'C'-shaped cross-section. One nail and some wood remains are preserved on the fragment. (Pl. 27A, 10)
- 4) Remains of the seam of a bronze nave-neck sheathing. Lost. (Pl. 27A, 13)
- 5) Fragments of iron nave-head rings with bronze inlaid lines and dots-and-circles. (Pl. 27A, 6.7)
- 6) Fragments of curved bronze sheet, ca. 28 mm in diameter, probably from the spokes. Lost. (Pl. 27A, 8)
- 7) Two fragmentary iron horse bits with large iron rings. Lost. (Zürn 1987, pl. 446, 17)
- 8) Iron ring, ca. 70 mm in diameter and 10 mm thick. Lost. (Paret 1935a, pl. 10, 2, 2)
- 9) Fragmentary iron dagger blade and remains of an iron scabbard wound with bronze wire, with an iron chape. (Pl. 24A, 3)
- 10) Bronze ring with round cross-section, 29 mm in diameter, 6 mm thick. Lost.
- 11) Bronze ring with round cross-section, 47 mm in diameter, 4–5 mm thick. Lost.
- 12) 10 bronze rivets, up to 11 mm in length. (Zürn 1987, pl. 446, 20)
- 13) Two fragmentary arched fibulae (*Bogenfibeln*) with long feet. Lost. (Pl. 27A, 11.12)
- 14) Fragment of a cast bronze handle, from a hemispherical bronze cup. (Pl. 27A, 9)
- 15) Two pieces of boar's tusk. Lost.
- 16) Two stepped pottery plates with engraved and stamped decoration. (Zürn 1987, pls 444, 1; 445A)
- 17) Pottery bowl with engraved decoration. (ibid. pl. 444, 2)
- 18) Small iron knife. Lost. (Pl. 24A, 14)

Museum: Heimatmuseum Ebingen, Albstadt-Ebingen.

49 Albstadt – Truchtlengen, tumulus 11 (Zollernalbkreis, Reg.-Bez. Tübingen)

References: Lieb and Streicher 1985, 98–99.

Description: Tumulus 11 measured ca. 17 m in diameter with a surviving height of 800 mm and was excavated in 1985. 23 tumuli are still visible in this cemetery and, in 1984 and 1985, three tumuli were excavated, uncovering seven graves dating to Ha C and D.

The central part of tumulus 11 had been destroyed by earlier excavations, probably in the 19th century. However, sufficient finds survived to show that the primary grave was an inhumation housed in a wooden chamber, but not in a grave pit (Fig. 163). The S part of the grave survived intact, with iron rings, an iron horse bit, and iron tyres remaining *in situ*. The tyres were ca. 23 mm wide with a cross-section of type III and had countersunk (type G) nails, bearing horizontal wood grain, spaced 150–160 mm apart. Two pottery vessels also survived: a dark brown undecorated conical-necked vessel and a small red undecorated collared bowl (*Kragenrandschüssel*).

Comments: Records survive from old excavations in this area, including those of 1886 by J. Dorn, and those of H. Edelmann from 1890 onwards. It may be possible to identify tumulus 11 with Dorn's tumulus VII of 1886, which also contained wagon fittings, along with at least 13 pottery vessels and an iron

spearhead (von Föhr 1892, 20–21; Zürn 1987, 215–6; pls 467–469A). The author is grateful to E. Lieb, Institut für Vor- und Frühgeschichte, Tübingen, for information on this new unpublished find.

Present location: Landesdenkmalamt Baden-Württemberg, Außenstelle Tübingen, Tübingen.

50 Altheim – Heiligkreuztal, tumulus 'im Wald Speckhau'

(Kreis Biberach, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 23; Goessler 1923, 208; Paret 1935a, 23; Riek and Hundt 1962, 2.

Description: A large tumulus (diameter 28 m, height 4 m), situated about 750 m W of the Hohmichele, was partly destroyed in 1877–8, whereby iron wagon parts were discovered. In 1880 Paulus excavated this same tumulus and found further wagon parts, made of iron and wood, and also some thin bronze plaques and tubes. In the middle of the tumulus he found a wooden grave chamber 1.5 m deep, covering an area of three square metres, which housed further remains of iron wagon parts. Paulus gave the finds to the Württembergisches Landesmuseum in the same year (inv. no. 8322). Paret was able to find remains of iron tyres from this excavation and described them in his article of 1935.

Finds:

- 1) Iron tyres, 30–34 mm wide. The cross-section is flat with the sides slightly bent down (type VII). The tyres were provided with relatively few nails. Lost.
- 2) Iron wagon parts. Lost.
- 3) Thin bronze plaques and tubes (a tubular or ferrule-shaped object is mentioned in the inventory of the WLM). Lost.

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. 8322).

51A Altheim – Heiligkreuztal, 'Hohmichele', grave I (Kreis Biberach, Reg.-Bez. Tübingen)

References: Riek and Hundt 1962.

Description: The Hohmichele is one of the largest tumuli in Central Europe, measuring almost 80 m in diameter and 14 m in height. It is situated 2.1 km W of the Heuneburg, among about 21 smaller tumuli; just to the N is another group of nine tumuli and ca. 700 m to the W are four more tumuli (including the tumulus 'im Wald Speckhau', see cat. no. 50).

More than half of the tumulus was excavated in 1937–8; a plan of the excavated area is shown on Riek and Hundt 1962, 7, fig. 2.

Grave I was robbed when the tumulus was only about 6.75 m high, at a time when secondary grave VI was covered by only 0.90–1.10 m of earth. The grave robbers dug a tunnel ca. 10.5 m long, 450–650 mm high and 600–670 mm wide. The course of the tunnel could be detected not only by the soil discolouration, but also by a number of glass beads on the floor of the tunnel, lost by the robbers.

The grave was built on the old ground surface and was made of wooden planks; the internal measurements of the chamber were 3.48–3.50 × 5.63–5.81 m with an internal height of 0.98–1.0 m. The chamber was orientated N12°E (Fig. 164). Owing to the soil conditions, no bones survived from grave I, but Riek believed there were probably three burials in the grave (Riek and Hundt 1962, 119).

At the E wall of the chamber was a fragment of iron tyre (Fig. 164, 1; Pl. 28B, 2), a small fragment of a spoke and an area of iron and bronze rust which seems to indicate the original position of the wagon. According to Riek, the naves left deposits of both bronze and iron rust, showing a wheel gauge of 1.10-1.15 m and a wheel base of 1.80-1.90 m. A squarish iron rust patch measuring ca. 1.05 x 1.05 m may have come from the wagon-box.

To the N of the wagon was a narrow iron fragment, probably from a knife (Fig. 164, 2). To the W of the wagon was a textile belt, 115 mm wide, decorated with gold (Fig. 164, 3; Riek and Hundt 1962, pl. 1, 2-4). In the SW part of the chamber was a bronze ring with square cross-section (Fig. 164, 4; *ibid.* pl. 1, 1) and a large number of glass beads (315 complete beads and fragments of 70-80 others, also a looped glass sphere, Fig. 164, 5 and *ibid.* pl. 1, 5).

Numerous organic remnants were found on the floor of the chamber, from textiles, horse and cattle fur, and cords made from horse and cattle hairs (including *ibid.* pl. 1, 6.7). Small fragments of textiles were also found on the walls of the chamber.

Finds were also uncovered outside the S wall of the chamber. These included a wheel 780-790 mm in diameter (Fig. 164, 6) with an iron tyre (Pl. 28B, 1) and iron fragments from the nave. According to Riek, wood remains show that the felloe was made of ash and measured 100 mm in height; furthermore, one tyre nail survived to a length of 98 mm. To the W of the wheel were two patches of iron fragments (Fig. 164, 7), remains of a sheep's fleece (Fig. 164, 8), and two piles of hazel-nuts and fruit stones (Fig. 164, 9).

To the E of the wheel was a rectangular iron sheet (Fig. 164, 10), a 'belt' decorated with bronze rein ornaments (Fig. 164, 11; *ibid.* pl. 1, 11), a fragmentary hollow iron boss on a round bronze disc (Fig. 164, 12; *ibid.* pl. 1, 10) and a miniature pottery vessel (Fig. 164, 13; *ibid.* pl. 1, 9). In this area there were also 193 glass beads, a rectangular amber bead and an amber ring (Fig. 164, 14; *ibid.* pl. 1, 8). Slightly to the N were some tufts of human pubic hair (Fig. 164, 15); two curls of human pubic hair were again found at Fig. 164, 16, one on each side of a plait of red human hair. Finally, at Fig. 164, 17 was a pile of fruit stones and to the E was a large rectangular fleece (Fig. 164, 18), to the W of which were some pieces of cord.

Comments: Grave VI had already been covered by almost 1 m of earth when grave I was robbed. The fact that grave I was robbed before its wooden roof had collapsed and before the string of the necklace of glass beads had decomposed (Fig. 164, 14), shows that grave VI was buried not long after grave I (not more than a few years later).

The finds deposited outside the S end of the wooden chamber are difficult to interpret. The plait and pubic hair suggest that the deposit had a ritual character different from the usual grave furnishings. The presence of a wheel in the deposit (Fig. 164, 6) is particularly strange; the author is not certain whether the tyre from this wheel is necessarily typologically different from the fragment inside the chamber (compare Pl. 28B, 1 with 28B, 2). However, Riek does not suggest that the wheel could have been removed from the chamber and left outside the S wall by the grave robbers.

Wagon finds:

- 1) One fragment of iron tyre, width 36 mm, length 201 mm, with a flat cross-section of type VII. No nails visible. (Pl. 28B, 2; Fig. 164, 1)
- 2) A few fragments of iron tyre, width 40 mm, with a flat cross-section of type VII. The tyre was 780-790 mm in diameter and one tyre nail was apparently 98 mm in length. On one

fragment, a nail head is preserved which was possibly square in shape (type E). (Pl. 28B, 1; Fig. 164, 6)

- 3) One fragment of a wooden spoke, length 85 mm, with elliptical cross-section (26 x 35 mm). Lost.

Museum: Württembergisches Landesmuseum, Stuttgart.

51B Altheim - Heiligkreuztal, 'Hohmichele', grave VI (Kreis Biberach, Reg.-Bez. Tübingen)

References: Riek and Hundt 1962.

Description: Grave VI was a secondary grave situated about 12 m SE of grave I and 2.15 m above ground level. The grave chamber was orientated N52°W and had the internal measurements 2.42-2.50 x 2.96-3.06 m with an internal height of 1.05-1.07 m. Most of the floor of the chamber was covered with cattle skins, but the walls of the chamber preserved no traces of textiles (Fig. 165). The chamber contained two inhumations, both orientated (head)SE-NW(feet). The male burial had two bronze serpentine fibulae of S4 construction, 120 mm long (Riek and Hundt 1962, pl. 9, 148-9), a bronze belt-sheet (*ibid.* pl. 9, 159), an iron neck-ring (*ibid.* pl. 9, 147), a large iron knife (*ibid.* pl. 9, 156-7), a leather quiver decorated with bronze bosses containing 51 iron arrowheads (*ibid.* pl. 10, 160-211) and an organic bow of which only the bow-string survived. The female burial had very numerous amber and glass beads (*ibid.* pl. 11, 222-5.241-2) and a single bronze serpentine fibula of S4 construction (*ibid.* pl. 11, 240).

Most of the chamber was taken up by the wagon, positioned at the NE side, and indeed the female burial lay under (or on?) the wagon-box. The gauge of the wagon was ca. 1.18 m and the wheel base ca. 1.80-1.90 m. The wood of the axles was relatively well preserved; in the case of wheel 1 the perforation of the axle for the linchpin was visible, and the axle extended 60 mm beyond the nave-head. The axles were flat on their upper sides. The axle of wheels 3 and 4 had a perforation in the middle, still containing a looped iron kingpin 208 mm long and square in cross-section (measuring 14 x 14 mm).

By the nave of wheel 2 was a 'T'-shaped hollow iron object with iron rings; the function of this object is uncertain, but Riek speculated that it might be the terminal of the draught pole. Another object which may belong to the wagon is represented by iron fittings for a wooden object ca. 65 mm in diameter and at least 470 mm long (*ibid.* pl. 3, 24-25). Close by were three iron rings (*ibid.* pl. 3, 22) and an iron loop (*ibid.* pl. 3, 23). The excavators also found remains of planks, 20-30 mm thick, which may have come from the wagon-box.

A pair of bronze disc-headed sockets and a pair of bronze half-cylinders (Pl. 27B, 4-7) were found above the axle of wheels 1 and 2. According to the position of the horse-gear, this must have been the rear end of the wagon and these four bronze fittings must have been attached to the rear end of the wagon-box.

Behind the wagon, by the NW wall of the chamber, was a large bronze cauldron containing a bronze vase (*ibid.* pl. 8, 144.146). Between wheels 3 and 4 was a flat bronze dish (*ibid.* pl. 8, 145). In the W corner of the chamber was a willow wickerwork basket.

In front of the wagon was a rich collection of horse trappings, comprising two heavy bronze three-looped rings, internal diameter 51 mm (*ibid.* pl. 4, 31-2), two bronze rein-knobs with central hemispherical boss, broad flange and two loops at the rear, diameter 71 mm (Fig. 105, 1; *ibid.* pl. 4, 37-8), 10 bronze rein-knobs with central hemispherical boss, broad flange and two loops at the rear, diameter 58-59 mm (*ibid.* pls 4, 39-42; 5,

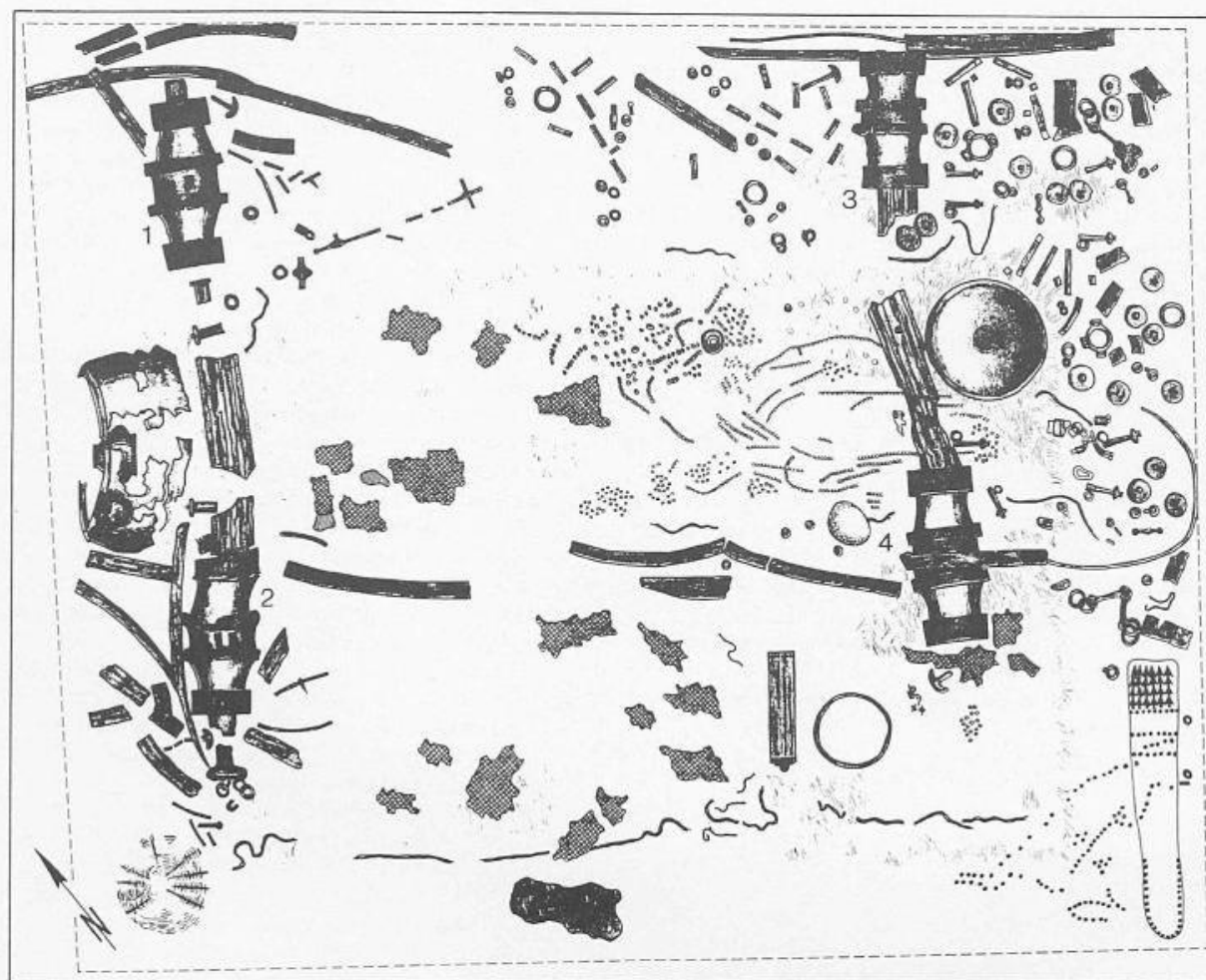


Fig. 165 Altheim-Heiligkreuztal, 'Hohmichele', grave VI: plan of the grave chamber (after Riek and Hundt 1962). – Scale 1:20.

43–8), six bronze rein-knobs with central hemispherical boss, broad flange and one loop at the rear, diameter 59 mm (ibid. pl. 5, 49–54), four long rectangular profiled rein ornaments with two loops at the rear, with both ends bevelled, measuring 17–18 × 120 mm (ibid. pl. 5, 55–8), four long rectangular profiled rein ornaments with two loops at the rear, with only one end bevelled, measuring 17–18 × 109 mm (ibid. pl. 6, 59–62), 21 rectangular profiled rein ornaments with two loops at the rear, with both ends bevelled, measuring 16 × 65 mm (ibid. pl. 6, 63–83), six square profiled rein ornaments with one loop at the rear, measuring 15 × 16–17 mm (ibid. pl. 6, 84–9), two bronze looped disc-ended hooks, length 60 mm (ibid. pl. 6, 90–1), two bronze double-rings (ibid. pl. 6, 94–5), four looped bronze rings (ibid. pl. 6, 96–9), 20 perforated conical bronze sheet rings, diameter 26–28 mm (ibid. pl. 7, 100–119), and 16 bronze rings, diameter 24–29 mm (ibid. pl. 7, 120–135).

Among the horse trappings were two iron horse bits with simple smooth shanks with round cross-section (ibid. pl. 4, 29–30) and eight bronze cheek-piece terminals each provided with an iron ring (ibid. pl. 7, 136–143).

Near the bronze dish were four boars' tusks, each in a bronze setting (ibid. pl. 11, 234–7), and close by was a pair of long animal incisors bound together by a strip of bronze sheet (ibid. pl. 11, 238), a bronze barrel-shaped pendant (ibid. pl. 11, 239), a piece of coral (ibid. pl. 11, 226), a piece of iron ore (ibid. pl. 11, 220) and an oblong piece of glass flux (ibid. pl. 11, 221).

Between the nave of wheel 4 and the iron horse bit was a small perforated whetstone (ibid. pl. 9, 151). A little to the NW of this nave was a smooth stone disc, similar to that in grave I.

Comments: The iron finds from this grave are in a very poor state of preservation and the author was not able to handle most of them. For this reason, for many of the wagon fittings, it is necessary to rely on the precise descriptions and illustrations offered by Riek and Hundt (1962).

Wagon finds:

- 1) Remains of four iron tyres with a flat cross-section of type VII, 38 mm wide, diameter 830 mm. The tyre nails had heads of type D, E or F (in one case roughly square, 12 × 12 mm); Riek thought that each tyre was provided with six nails. The nails survived with penetrations of 60–68 mm, which apparently approximates to their original length. On one tyre fragment, a fragmentary felloe-clamp survived. (Riek and Hundt 1962, pl. 3, 27)
- 2) Remains of four naves, made of elm wood, with bronze and iron fittings. The naves measured 400–408 mm long, *in situ*, and the distance between the two iron nave-stock rings was 70 mm. The nave fittings consisted of an iron nave-cap with an axle-channel 53–55 mm in diameter, an iron nave-head ring 132 mm in diameter and 60–64 mm long, a bronze sheet nave-neck sheathing, and an iron nave-stock ring 161–175 mm in diameter. One of the nave-head rings bore

11 engraved lines, otherwise the nave-head rings were undecorated. All the nave-stock rings were decorated with inlaid bronze. The outer part, facing the tyre, had simple radial linear decoration in inlaid bronze, and seven engraved lines. The part of the nave-stock ring facing the nave-head had more complicated bronze inlaid decoration comprising groups of five radial lines and cross-hatched panels. The bronze sheet nave-neck sheathing was joined by a seam: the ends of the bronze sheet were overlapped and covered by a narrow strip of bronze, which was fastened to the wooden nave-neck by at least four nails. (Pls 28A; 29)

- 3) Each wheel had 10 spokes made of oak. Apparently the spokes did not taper and had a sub-rectangular cross-section, ca. 32 × 25 mm. Lost.
- 4) Remains of four iron linchpins with semi-lunate heads and shanks with round cross-section. A hole is visible at the end of one shank. (Pl. 27B, 1-3)
- 5) Looped iron bolt (kingpin), length 208 mm, cross-section square, measuring 14 × 14 mm. About 20 mm before the end of the bolt were remains of a hole. (Riek and Hundt 1962, pl. 3, 26)
- 6) Two bronze half-cylinders with semicircular end-plates; length 54 mm. (Pl. 27B, 6-7)
- 7) Two bronze disc-headed sockets, length 68 mm, head diameter 40 mm. (Pl. 27B, 4-5)

Museum: Württembergisches Landesmuseum, Stuttgart.

52 Asperg, 'Grafenbühl'

(Kreis Ludwigsburg, Reg.-Bez. Stuttgart)

References: Zürn 1970, 7-38.

Description: The 'Grafenbühl' was situated 650 m from the Hohenasperg. It had long been damaged by agricultural and building activity and was finally excavated in 1964 and 1965 to avoid total destruction. The original diameter of the tumulus was ca. 40 m and the greatest surviving height reached 2.2 m. The central grave pit was dug into an artificial hummock, which may have been an earlier tumulus (perhaps Bronze Age). The pit was 800 mm deep and measured 5.5 × 5.5 m, orientated NNW-SSE. There were clear remains of the wooden chamber floor (Zürn 1970, 11, fig. 4; pl. 59, 2), which was made of planks lain over three long parallel timbers (orientated NNW-SSE). The floor measured at least 4.8 × 4.8 m and Zürn estimates the internal dimensions of the chamber as 4.5 × 4.5 m. A post-hole shows that the roof was supported by a central post. Zürn suggests that the chamber had an internal height of 0.8-1.0 m.

The central grave was certainly robbed in antiquity. According to the position of the remaining finds, Zürn was able to estimate that the robbery took place 10-20 years after the burial, when the chamber still stood intact and the body had already decomposed completely. According to the surviving bones the skeleton was of a male aged about 30 years and originally lay in the SW corner of the chamber.

The only *in situ* finds were two bronze tripod feet (in the SE corner of the chamber) and some fittings near the NE side of the chamber, which Zürn thought represented a chair. The wagon parts were found in the NE half of the chamber.

Finds:

- 1) Four tyre fragments, 35 mm wide with a cross-section of type II. The curvature of the surviving fragments indicated a wheel diameter of ca. 750-800 mm. (Pl. 30, 1-2)
- 2) Seven fragments from nave fittings of type Cannstatt. These

include two fragmentary nave-caps with an original external diameter of 130 mm and an axle-channel diameter of 52-60 mm (Pl. 30, 7.11-2). Five fragments of nave sheathings, from the front of the nave-head (Pl. 30, 7), from the back of the nave-head (Pl. 30, 9) and from the front of the nave-stock (Pl. 30, 6). Owing to the finer ribbing of another fragment, it may belong to the nave-neck (Pl. 30, 10). The seventh fragment, owing to its size, would most likely belong to the nave-head (Pl. 30, 8). According to this reconstruction the nave-head would be at least 68 mm in length and the nave-neck at least 66 mm long. (Pl. 30, 6-12)

- 3) One axle-cap with linchpin, 130 mm in diameter. (Pl. 31A)
- 4) One fragmentary object made from two overlapping pieces of iron sheet with arched cross-section. (Pl. 30, 5)
- 5) Two bronze terminals with iron shafts. (Pl. 30, 3-4)
- 6) The grave contained numerous fragmentary objects which are fully described by Zürn (1970). Many of the objects had been imported from the Mediterranean world: numerous decorative fragments of bone, ivory and amber (Zürn 1970, pls 3-4; 6-9; 65-7), these probably decorated a wooden *kline* (Fischer 1990); an ivory lion's foot was probably part of a small piece of furniture such as a footstool; an ivory disc survives from a fan (Zürn, 1970, pl. 5); two bronze lion's feet from a rod-tripod (ibid. pls 10-11); fragments of bronze cauldrons (ibid. pl. 12); bronze sheet (ibid. pl. 13); bronze rings (ibid. pl. 14, 1-8); a bronze 'rattle' made from two long rectangular bronze sheets (ibid. pl. 15, 1); small bronze objects (ibid. pl. 14, 9-14); four bronze decorative wheel-shaped objects (ibid. pl. 14, 15-18); iron fragments (ibid. pls 17, 1-8.10; 18, 4-29); iron rings (ibid. pl. 18, 1-2); an iron chain fragment with double rings (ibid. pl. 18, 3); two hollow iron spheres on an iron socket (ibid. pl. 19, 1-2); remains of decorated iron sockets (ibid. pl. 19, 3-4); axe-like iron objects (ibid. pl. 19, 5-6); a bronze *Fußzier*-fibula decorated with gold sheet, and a second fragmentary example (ibid. pl. 20, 1-2); decorated gold sheet (ibid. pl. 20, 4-5.7); iron belt-sheet with two iron hooks, decorated with bronze and gold (ibid. pl. 20, 3); gold threads (ibid. pl. 20, 6); bronze rivets covered with gold sheet (ibid. pl. 20, 8-18); bronze, bone and wooden remains of a (?) chair found *in situ* (ibid. pl. 21, c-h).

Museum: Württembergisches Landesmuseum, Stuttgart (wagon parts, inv. no. V.68, 20.g.s.).

53 Bad Urach

(Kreis Urach, Reg.-Bez. Tübingen)

References: Goessler 1909, 137; Zürn 1987, 163.

Description: During ditch-digging in 1898 a large number of typical late Hallstatt finds was discovered between the *Amtsgericht* and the *Bismarckdenkmal*. Further finds came to light in the *Schloßhof*, including: an iron ring from a nave, bronze nave fittings, seven fragments from an iron nave, remains of a bronze cauldron, numerous iron tyre fragments, a few bones and some sherds (see Zürn 1987, pl. 320A, 2-3; possibly pl. 291, 1).

Comments: The author assumes that the finds come from more than one wagon, with naves of type Winterlingen and type Cannstatt. Goessler suggested that an interpretation of the discovery as a levelled tumulus cemetery is precluded by its position at the bottom of a valley.

Finds:

- 1) Numerous iron tyre fragments. Lost.

- 2) Iron nave-stock ring with 'C'-shaped profile, external diameter ca. 165 mm, internal diameter 120–123 mm. The nave-stock ring is decorated with four rings of diagonal lines of inlaid bronze, forming a herring-bone pattern. Catalogue number 53A. (Pl. 31B, 5)
- 3) Fragment of bronze nave-neck sheathing. The fragment includes the seam of the bronze sheathing, joined by a row of round flat-headed bronze nails. One end is bent almost to a right-angle and would have been covered by the nave-head ring. At the other end of the nave sheathing is another slight bend, which probably indicates ribbed decoration. Catalogue number 53A. (Pl. 31B, 2)
- 4) Another fragment of bronze nave-neck sheathing, showing that the nave-neck was at least 103 mm long. Catalogue number 53A. (Pl. 31B, 1)
- 5) Five more fragments of bronze sheet from the nave-neck sheathing. Catalogue number 53A.
- 6) Five fragments of iron fittings from a nave of Cannstatt type. Catalogue number 53B. (Pl. 31B, 3.4)
- 7) Iron loop. (Zürn 1987, pl. 320A, 2)
- 8) Fragment of iron sheet with a nail. (ibid. pl. 320A, 3)
- 9) Bronze cauldron, rim diameter 370–450 mm with remains of iron ring-attachments. (possibly ibid. pl. 291, 1)

Museum: Württembergisches Landesmuseum, Stuttgart (originally in the Stadtmuseum, Urach).

54 Berghülen

(Alb-Donau-Kreis, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 12–13.53–54; Goessler 1911, 22; Paret 1935a, 23; Zürn 1961, 17; ibid. 1987, 35–6.

Description: The largest tumulus in this group was excavated by von Föhr on the 12th September 1884. The tumulus was examined by means of a rectangular trench, revealing a stone core at least 1.43 m high. Half way down, a ribbed bronze arm-ring was found (Zürn 1961, pl. 12A, 5) and on the base, in the middle of the tumulus, 'a curved iron band, in several pieces, with small nails and traces of wood', also sherds (ibid. pl. 11B) and some charcoal. Further finds from von Föhr's excavations, in the Württembergisches Landesmuseum, could possibly have come from Berghülen, but they are definitely not mentioned in the report of the excavation of this tumulus (these finds are published by Zürn 1961, pl. 12A, 1–4.6–7).

Goessler (1911, 22) noted that the fragmentary curved iron band was a wheel tyre and not, as von Föhr suggested, part of a shield. Goessler was the only author who saw the tyre fragments in the Württembergisches Landesmuseum: by the time of Paret's article (1935a), the tyre fragments were lost.

Comments: Von Föhr's excavation report provides little information, but suggests that the tyres came from a primary grave covered by a stone core. The pottery vessel and bronze arm-ring (Zürn 1961, pls 11B; 12A, 5) can probably be regarded as belonging to the same grave.

Finds:

- 1) Iron tyre fragments. Lost.
- 2) Small pottery bowl. (Zürn 1961, pl. 11B; ibid. 1987, pl. 3B, 2)
- 3) Charcoal. Lost.

probably associated:

- 4) Ribbed solid bronze arm-ring with overlapping ends and roughly circular or slightly oval cross-section. (Zürn 1961, pl. 12A, 5; ibid. 1987, pl. 3B, 1)

Museum: Württembergisches Landesmuseum, Stuttgart.

55 Bitz

(Zollernalbkreis, Reg.-Bez. Tübingen)

References: Lindenschmit 1860, 136.203; Paret 1935a, 23; Zürn 1987, 219.

Description: No information is available concerning the excavation of this tumulus. The tumulus contained some iron tyre fragments, two iron spearheads, a small ring of fine gold sheet, a piece of boar's tusk, two complete pottery vessels and numerous sherds.

Finds:

- 1) One fragment of an iron tyre of type V, 23 mm wide, and an iron tyre nail of type C. On the tyre fragment are two large-headed nails, the shafts of which preserved traces of horizontal wood grain. The nail heads are 49–57 mm in length and 17–19 mm wide. (Pl. 32A)
- 2) Two iron spearheads. Lost. (Lindenschmit 1860, pl. 7, 3–4)
- 3) Small ring of fine gold sheet. Lost. (ibid. pl. 7, 8)
- 4) Two pottery vessels, reddish coloured. One survives. (Zürn 1987, pl. 478B)
- 5) Pottery sherds. (ibid. pl. 476B, 3–4)
- 6) One piece of boar's tusk. Lost.

Museum: Fürstlich Hohenzollernsches Museum, Schloß, Sigmaringen (inv. nos 6–10).

56 Breisach am Rhein – Gündlingen, 'Zwölferbuck'

(Kreis Breisgau-Hochschwarzwald, Reg.-Bez. Freiburg)

References: Wagner 1885, 21–4; Wagner 1908, 184–185; Rest 1939. Unpublished manuscript by E. Wagner in the Badisches Landesmuseum, Karlsruhe, dated 1879 (Verzeichnis der Alterthümer-Fundstätten im Großherzogthum Baden, pages 164–6).

Description: The 'Zwölferbuck' is an isolated tumulus measuring 45 m in diameter and 5–6 m in height. It was excavated by E. Wagner in 1888: he opened a circular area 13 m in diameter in the centre of the tumulus. The results of his excavations are shown on a plan (Fig. 166). The finds lay on the natural ground surface, except for two parallel wooden poles which Wagner mentioned lay slightly higher (Fig. 166, k–l.j). At 'y' (on the plan, Fig. 166), the excavators found some fire-blackened stones with a little cremation. An area 'x' of ash and black earth spread 2 m to the S of the stones and at 'w' was a square-shaped area of ash measuring 700 × 700 mm. At 'u' were iron tyre and nave fragments, as well as a fragmentary horse bit and some fragments of decorated iron sheet. In the same complex were two bronze double-rings ('v.v'). S of this ('n') was a patch of wood with the grain running roughly W-E. To the E of this wood was a collection of finds: a few fragments of bronze sheet ('t'), some bronze ring-footed rein knobs and some small rein-knobs ('s'), and a pile of sherds ('r'). Further to the S was a piece of iron tyre ('p') and then another patch of wood with the grain running approximately E-W ('m'). To the E of the wood was a pile of sherds ('r'), some tyre fragments and four bronze rings ('k'). Further S were three pieces of iron tyres ('p.p.p'). In this area were two long wooden poles, about 100 mm thick with an irregular oval-shaped cross-section ('j' and 'k-l'). The longer pole measured 2.6 m in length. S of the shorter pole was the tip of an iron sword ('g') and at the S end of the longer pole was a pile of sherds ('r').

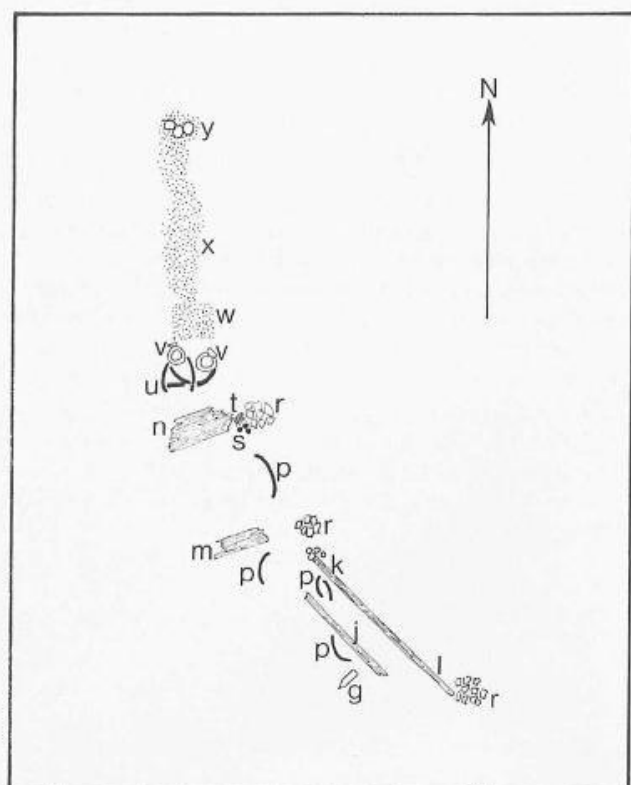


Fig. 166 Breisach am Rhein-Gündlingen, 'Zwölferbuck', plan of the grave floor (after an unpublished drawing by E. Wagner). – Scale 1:100.

Comments: All the finds from this grave have been lost and it is necessary to rely on the descriptions by E. Wagner and W. Rest. Sadly, the poor quality of Wagner's excavation and contradicting information, particularly concerning the wagon finds, make an understanding of this grave problematical. However, Rest did make clear that the wagon parts were too numerous for a two-wheeled vehicle and so a four-wheeled wagon may be accepted. In defence of Wagner, the grave may have been robbed before excavation, which could account for the unsatisfactory nature of his excavation plan.

Finds:

- 1) Fragments of iron tyres, allowing an estimated wheel diameter of ca. 750 mm. Wagner and Rest disagree on the width of the tyres: 20 mm according to Rest and 25 mm according to Wagner. The tyres were 'domed' in cross-section. Wagner and Rest are also in disagreement concerning the tyre nails; Wagner writes that the nail heads did not show above the level of the tyre, but in Rest's drawing a nail head is clearly visible (Pl. 32B, 13). The two authors again give differing information concerning another feature of the tyres: Rest stated that the tyres were provided with square flanges holding domed-headed nails which were driven into the felloe (Pl. 32B, 13–4). Wagner, on the other hand, thought that the sides of the felloe were fitted with iron sheet. (Pl. 32B, 13)
- 2) Fragmentary iron nave fittings. The naves were reconstructed in the Karlsruhe Museum with a rather complicated shape (Pl. 32B, 1), while Rest suggests a simple cylindrical reconstruction (Pl. 32B, 10). Neither of the reconstructions is convincing. Instead, the fittings very

probably belong to the Breitenbronn type: in Rest's reconstruction the nave-head fittings appear to have mistakenly been fitted to the nave-stock. According to Rest, the cylindrical part of the nave was 70 mm long and 84 mm in diameter, while the profiled part on the nave-stock had a minimum diameter of 84 mm and a maximum diameter of 140 mm, and was about 36 mm wide. (Pl. 32B, 1.10)

- 3) Remains of an iron horse bit, with one large iron ring, 46 mm in diameter. (Pl. 32B, 11)
- 4) Three bronze ring-footed knobs and four small bronze rein-knobs, threaded on a leather rein. (Pl. 32B, 12)
- 5) Two bronze rings with square cross-sections, diameter 35 mm. (Pl. 32B, 5–6)
- 6) Two bronze rings with square cross-sections, diameter 52 mm. (Pl. 32B, 3–4)
- 7) Two bronze rein-rings. A bronze ring 55 mm in diameter with square cross-section sits on a small hemispherical cup which holds a small bronze ring 18 mm in diameter with square cross-section. (Pl. 32B, 8)
- 8) Crescent-shaped bronze object with square cross-section; in the middle of the crescent sits a small bronze ring 35 mm in diameter. (Pl. 32B, 9)
- 9) Iron sword tip wrapped in cloth, length 114 mm. (Pl. 32B, 2)
- 10) Several fragments of iron sheet on a wooden background. The iron sheet bore zig-zag or triangular decoration. (Pl. 32B, 7)
- 11) A few fragments of bronze sheet.
- 12) Conical-necked vessel (*Kegelhalsgefäß*) with rim graphited inside and outside and neck graphited on the outside. The shoulder is divided into fields of red-painted, graphited, stamped and engraved decoration. Height 370 mm. (Pl. 32B, 16)
- 13) High-shouldered collared vessel. The rim is graphited inside and outside. The shoulder and body of the vessel are decorated with bands of graphited, red-painted and engraved decoration. Height 130 mm. (Pl. 32B, 15)
- 14) Large decorated pottery vessel.
- 15) Hemispherical cup graphited inside and outside.
- 16) Pottery sherds.

Museum: Badisches Landesmuseum, Karlsruhe (all finds lost; inv. no. C.5710–5715).

57A Buchheim, tumulus cemetery near the 'Wolfegg' tumulus of 1873

(Kreis Tuttlingen, Reg.-Bez. Freiburg)

References: Wagner 1908, 38–39; Paret 1935a, 24; Rest 1939.

Description: A large tumulus, in a cemetery of 22 tumuli, was excavated by farmer Bauer in 1873. C. F. Mayer described what the farmer found: 'Auf einer Wiese, dem Landwirt Bauer von Buchheim gehörig, war ein großer Hügel. Ich wollte ihn untersuchen, Bauer duldete es nicht, sondern grub ihn selbst um und fand einen Bronzewagen. Die Radspeichen waren mit Bronzeblech eingehüllt und ein prachtvoller Löwenkopf zierte die Deichselspitze. Bauer schlug das Bronzeblech zusammen und wollte es, in der Meinung es sei Gold, schmelzen, was ihm nicht gelang. Ich traf bei meinem weiteren Besuch nur noch die Bronzeclumpen und einen Hut voll Tonscherben an. Bauer trat sie mir zu keinem Preis ab, wahrscheinlich sind die noch brauchbare Artefakte nach Sigmaringen gekommen.' In fact, the finds have all been lost.

57B Buchheim, tumulus cemetery near the 'Wolfegg' finds in Berlin

(Kreis Tuttlingen, Reg.-Bez. Freiburg)

References: Rest 1939.

Description: In the inventory book of the Museum für Vor- und Frühgeschichte (West Berlin), a few finds are listed from Buchheim, BA Meßkirch, Kr. Konstanz, from a 'tumulus with stone core, an inhumation and a few sherds'. According to Rest, these finds come from the tumulus group near the 'Wolfegg'. The finds include a fragment of an iron tyre and some horse-gear. The finds are lost, but the inventory book includes some sketches which are reproduced here.

Finds:

- 1) Fragment of an iron tyre of type I with two long-headed nails of type A, length 200 mm. (Pl. 32D, 1)
- 2) One bronze ring-footed rein-knob, height 24 mm, greatest diameter 24 mm. (Pl. 32D, 4)
- 3) A number of small basket-shaped rein-knobs, ca. 10 mm wide. (Pl. 32D, 2)
- 4) Fragmentary bronze ring with round cross-section, diameter ca. 22 mm. (Pl. 32D, 3)
- 5) Sherds.

Museum: Museum für Vor- und Frühgeschichte, Schloß Charlottenberg, West Berlin (inv. no. IIc. 3086–3089).

58 Burladingen – Gauselfingen, tumulus of 1853

(Zollernalbkreis, Reg.-Bez. Tübingen)

References: Lindenschmit 1860, 209–210; Zingeler 1894, 41; Paret 1935a, 24; Zürn 1987, 221.

Description: This tumulus was excavated in 1853 by von Mayenfisch. According to Lindenschmit a large collection of assorted objects was found, including a fragmentary bronze palstave, some glass objects, spindle-whorls etc. Some of the finds date to the Hallstatt period and may have come from the same grave as the tyre fragments (Lindenschmit 1860, pl. 14, 1–13).

Wagon finds:

- 1) Three iron tyre fragments of type V and two iron nails of type C. The tyre nails have large rectangular heads and were probably set closely spaced on the tyre. One nail-shank is 60 mm long and bears horizontal wood grain. (Pl. 32C)

Museum: Fürstlich Hohenzollernsches Museum, Schloß, Sigmaringen (inv. no. 133).

59 Eberdingen – Hochdorf an der Enz

(Kreis Ludwigsburg, Reg.-Bez. Stuttgart)

References: Biel 1982; *ibid.* 1985a; *ibid.* 1985b; *ibid.* 1987; Paret 1987d.

Description: Although the tumulus of Hochdorf is situated about 10 km from the Hohenasperg, it is visible from the supposed *Fürstensitz*, and could belong to its territory. It was not an isolated tumulus; indeed another tumulus, about half as large, is visible just to the N. At the start of the excavation, which took place in 1978 and 1979, the tumulus had almost been levelled, surviving only with a height of 1.5 m. However, the excavators estimated that the tumulus was originally ca. 60 m in diameter with a height of ca. 6 m. The tumulus was severely damaged and about one quarter of the tumulus had been eroded below the

Hallstatt period ground surface. Indeed only three secondary burials were found, two of which were stratigraphically contemporary with the primary grave (grave 3 with an iron razor and two bronze S5 serpentine fibulae; grave 4 with two bronze S5 serpentine fibulae, an undecorated bronze belt-sheet, an iron knife and a pottery vessel containing cremated bones). The other secondary grave, grave 2, was stratigraphically later than the primary grave and contained two cast drum fibulae (*Paukenfibeln*), a simple bronze neck-ring, a bronze toggle, a small bronze ring and two iron spearheads.

Inside the perimeter of the tumulus was a wide stone ring, 57 m in diameter, under which was a simple circle of stones accompanied by a circle of large post-holes. Apparently, the burial ritual entailed the construction of a primary tumulus 40 m in diameter and 1.5 m high, with a complex entrance in the N, 6 m wide, lined and faced with stone walling. The entrance lead to the open chamber via a ramp. Workshop debris was put into pits in this primary tumulus (charcoal, slag, melted bronze, tools, scrap metal, half-made bronze and gold debris, and amber waste). After the central grave had been sealed, earth for the tumulus was dug from the surrounding area, resulting in a ring-shaped depression up to 1.5 m deep and 30 m wide.

The grave was housed in a square pit, 2 m deep, measuring 11 × 11 m, with a deeper square depression for the wooden chamber itself, 0.4 m deep. The grave chamber had the internal measurements 4.7 × 4.7 m, with an internal height of at least 1 m (Fig. 167). The grave chamber was encased in an outer wooden chamber with the internal dimensions 7.4 × 7.5 m, and ca. 2 m high. Both chambers were of oak and were orientated N-S/E-W. The space between the two chambers was filled with large stones. The burial was found by the W wall of the chamber, lying on a magnificent bronze *Kline*, orientated (head) N-S (feet); anthropological study indicated a male 40–50 years old.

The personal goods of the burial comprised two bronze S5 serpentine fibulae, two gold S5 serpentine fibulae, a gold arm-band, an iron dagger with bronze scabbard and gold cover, a bronze belt-sheet with gold cover, a conical birch bark hat, five amber beads, a bag containing iron toilet implements and three iron fish-hooks, an iron razor, an organic comb, a quiver with bronze and iron arrowheads, a gold neck-ring and gold shoe fittings. Hanging on the S wall of the chamber were nine drinking horns (eight of horn and one of iron) with gold decorative bands. In the NW corner was an imported greek cauldron, the rim of which was adorned with three bronze lions and three bronze handles; inside the cauldron was a small gold cup.

The wagon was positioned at the E side of the grave, with its front to the S; on it were placed three bronze basins of type Hatten, nine bronze plates, an iron square-socketed axe, an iron knife and an iron spearhead. Also on the wagon was a yoke of maple wood adorned with ornaments including bronze bands, two bronze horses and two bronze knife-shaped pendants. Placed on the centre of the yoke was a large bronze chain pendant. Also belonging with the yoke were two broad leather straps richly set with bronze decoration. By the yoke was harness for two horses, including two iron horse bits and numerous bronze rein-knobs (25 mm in diameter) and bronze phalerae (79 mm in diameter). The cheek-pieces were made of wood covered with bronze sheet bands, and had cast bronze terminals. Also on the wagon was a wooden *stimulus* or goad, 1.66 m long, with a bronze point and bronze sheet decoration.

The chamber contained much organic material, including textiles. The floor and walls of the chamber were completely lined with textiles, held together by 18 bronze S5 serpentine fibulae and two bronze drum fibulae.

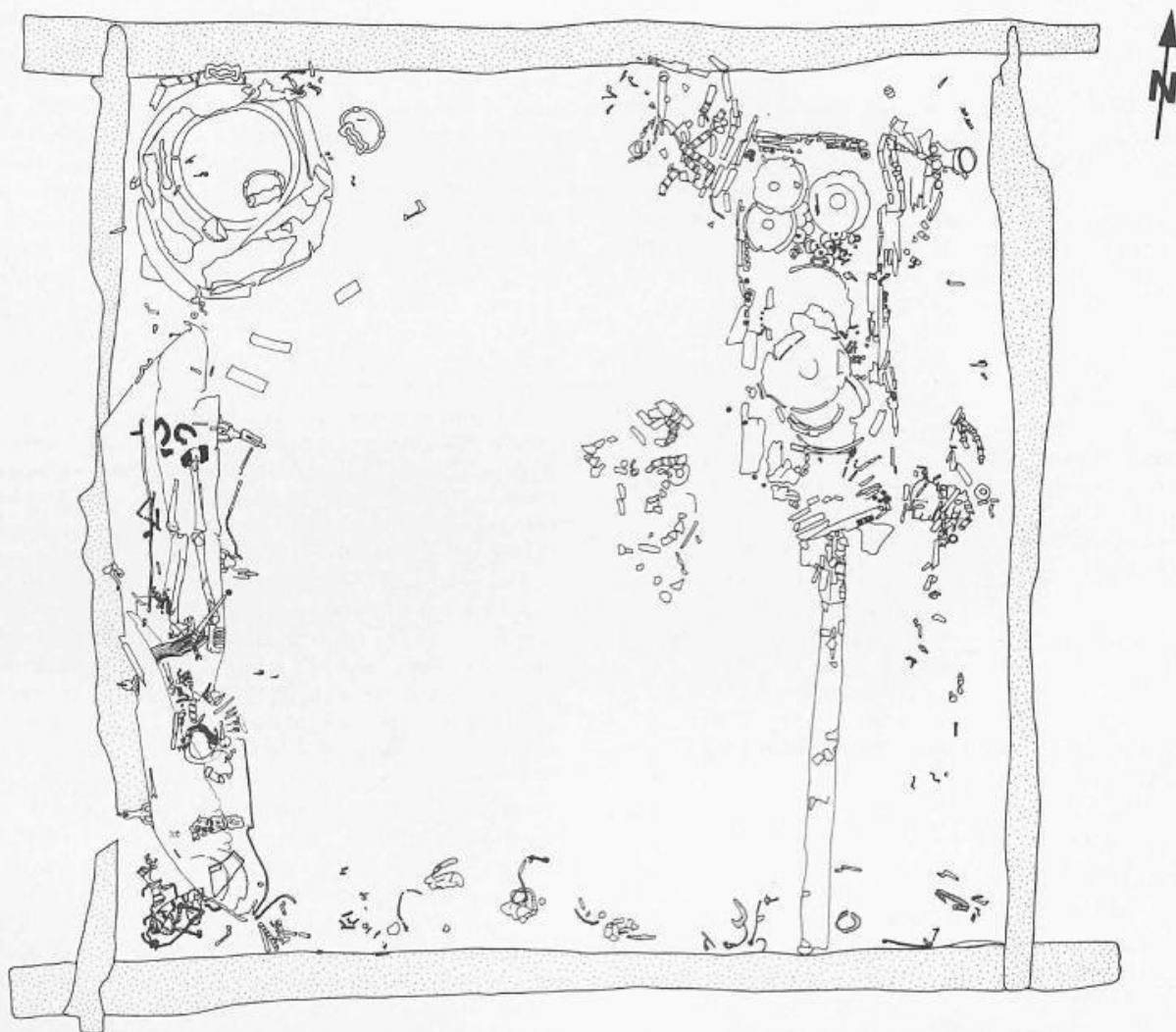


Fig. 167 Eberdingen-Hochdorf: plan of the grave chamber (after Biel 1982). – Scale 1:40.

The wagon was found by the E wall of the chamber, facing to the S (Fig. 93). Much of the wagon (wheels, pole and box) was covered by iron sheet with filed linear decoration. Biel mentions that copper solder had sometimes been used to join together the iron fittings. The wagon had a gauge of 1.13 m; the wheel base was slightly less than the length of the wagon-box (1.71 m). Although the wagon was put into the chamber with the wheels and pole mounted, the four linchpins and the axle-cap of the NW wheel were found placed on the wagon-box.

The wheels were 890 mm in diameter and had 10 spokes. A single-layered bent felloe was used (probably 60–70 mm high), of ash for the front wheels and of elm for the back wheels. The spokes were made of maple and the naves were of elm. The wheels were completely covered with decorated iron sheet, except for a narrow band below the tyres. The tyres were 35 mm wide and 5 mm thick and their sides projected slightly downwards to accommodate the felloe (type VII). The nail heads were large, but irregularly shaped (roughly subrectangular, ?type E) and spaced 140 mm apart. Each tyre had 20 nails, every second nail being driven into a spoke tenon. Each felloe was covered with 20 pieces of iron sheet with filed linear decoration; iron bands with similar filed decoration were also used to cover the joins between the segments of iron sheet. The

iron sheet felloe sheathing left uncovered a narrow band of wood below the tyre. The spokes were 260 mm long and circular in cross-section, tapering from the nave-stock (diameter 46 mm) to the felloe (38 mm). Each spoke was sheathed in an iron cylinder made from a single piece of iron sheet, which was additionally decorated with six iron cuffs with linear filed decoration. The tenons of the spokes were fitted into sockets in the felloe, but only penetrated half way through the thickness of the felloe. The type Cannstatt naves were 460 mm long and had an axle-cap which added a further 45 mm to their length. The axle-channel of the nave was 50 mm in diameter and the nave itself measured 178 mm in diameter. The naves were constructed from a number of wooden segments which were fastened together by wooden dowels. On the nave-stock was a broad iron band with 10 circular projections for the ends of the spokes. There followed another band bearing a narrow iron strip with linear filed decoration. The front of the nave-stock was stepped in profile, leading to the nave-neck, the iron sheathing of which again bore a narrow iron strip with linear filed decoration. The nave-head was long, bearing three narrow iron strips with filed decoration. The nave was terminated by an iron nave-cap. The axle-caps were of iron, the profile of their circular flange repeating that of the front of the nave-stock; the axle-caps had a conical neck and

a bulbous richly-profiled head. Each axle-cap was fitted with a linchpin with a small subtriangular head.

The wagon-box was rectangular, measuring 1.71 × 0.68 m, with sides 85 mm high. The outer surface of the sides was covered with iron sheet and divided into five horizontal fields, three with linear filed decoration separated by two in-set undecorated bands. The upper edge of the sides was also covered with iron sheet, bearing evenly-spaced hollow iron hemispherical ribbed bosses, each affixed by a spherical-headed iron nail. The upper edges of the sides were all 30 mm wide; in contrast, the bases of the long sides were 55 mm wide, of the rear side 60 mm wide, and of the front side 65 mm wide. The sides were therefore made of strong timbers, trapezoidal in cross-section. The corners were covered by separate iron sheet fittings, either side of which was set with nine hollow hemispherical ribbed iron bosses. The upper surfaces of the corners were then capped by triangular iron plates, each with one large hemispherical ribbed iron boss, and six similar iron bosses of the normal size. The floor of the wagon-box was made of thin ash rods (not more than a few centimetres in diameter) – set longitudinally and woven together either with leather or with thin wooden branches. Below the rear side of the wagon-box, extending over the whole width of the box, was a half-cylindrical iron fitting of unknown function. It has no visible means of attachment, and not only has the same diameter as the draught pole axle, but was also decorated in a similar way.

The pole, probably made of apple or pear wood, was 2.38 m long, with a pointed-oval cross-section 50 mm thick, tapering from 158 mm wide at the base, to 72 mm wide at the tip. The pole is covered with iron sheet (bearing narrow iron bands with filed linear decoration), except for the lower side which is left free. The base of the pole is 'T'-shaped, articulated with the wagon by a short axle, and complete with small axle-caps. The pole axle is composed of three parts: a 'T'-shaped extension of the pole, with two short cylinders to either side of it. These short cylinders are covered for three-quarters of their surface by iron sheet, each of which then has a small rectangular flange projecting towards the wagon.

Comments: The above description of the Hochdorf tumulus and wagon is drawn from the publications of J. Biel (1982; 1985a; 1985b; 1987).

Museum: Württembergisches Landesmuseum, Stuttgart.

60 Emerkingen

(Alb-Donau-Kreis, Reg.-Bez. Tübingen)

References: Miller 1892, 65–66; Miller 1893, 19; Bach 1893, 5; Hölder 1895, 26; Paret 1935a, 25; Zürn 1987, 44.

Description: The largest of three tumuli (diameter 32 m, height 2.3 m) was opened by the land-owner in 1890. Towards the middle he came across oak planks, sherds, human bones and an iron dagger (Miller 1893, 21, fig. 6). On the 1st October of the same year the tumulus was further excavated by Miller. He also found the oak boards on the base in the middle of the tumulus. The boards formed a rectangular chamber 3.5 m long and 2.95 m wide (Miller 1892, pl. 8), which apparently contained the remains of two cremations. In the chamber were two areas of 'rust', each 500 mm in diameter, one of which containing fragments of iron which Miller interpreted as remains of iron tyres (supposedly about 400 mm in diameter). In the other patch of rust were bronze fragments, apparently from a nave 180 mm in diameter. Painted sherds, hazel-nuts and various pieces of wood were also found in the chamber.

Although Miller states that the finds were given to the Württembergisches Landesmuseum, they have not been identified by any other author and they were certainly lost by 1935, when Paret mentioned the find. Miller's report gives a confusing picture of this grave and Paret doubted his interpretations. Nevertheless, it seems certain that Miller found a primary chamber grave provided with a wagon, dagger and pottery vessels.

Comments: A number of unprovenanced metal nave fittings are housed in the Württembergisches Landesmuseum. Owing to typological considerations, these must derive from three different wagons: A (Pl. 33A, 2), B (Pl. 33B) and C (Pl. 51D, 2). Three *known* graves come into question for these fittings, from Emerkingen, Engstingen – Großengstingen and Ulm – Eggingen.

A) According to Miller the finds from Emerkingen, including the dagger blade, were sent to Stuttgart, and then lost (Miller 1893, 21, fig. 6). This dagger blade must be the piece recently published by S. Sievers (1982, pl. 19, 103; here Pl. 33A, 1), who mistakenly assigned it to a grave from Sankt Johann – even though von Föhr only mentioned 'two iron spearheads, fine bronze rings, remains of a bronze belt, large bones and iron rust' from this grave (1892, 15.56). The nave parts from Emerkingen were made of bronze and, according to Miller, had a diameter of 180 mm, which corresponds to the reconstruction of the 'A' group of nave finds (Pl. 33A, 2).

B) The bronze nave-neck fittings and the iron nave-cap fragment (Pl. 33B) probably belong to a nave of Erkenbrechtsweiler type. Iron nave-caps were expressly mentioned for the grave from Engstingen-Großengstingen (Lindenschmit 1860, 137). Furthermore, these two nave fragments bear inventory numbers from the collection of the Herzog von Urach (nos 781 and 784) and it is highly likely that the finds from this excavation, lead by Graf Wilhelm of Württemberg, were kept in the ducal collection.

C) According to these considerations, the 'C' group of nave parts should come from the grave of Ulm-Eggingen. But this piece (Pl. 51D, 2) bears an inventory number from the collection of the dukes of Urach (no. 782) and it is difficult to understand why finds from von Föhr's excavation should end up there. However, the finds in the inventory book of the collection of the dukes of Urach coming before and after our nave fittings (nos 781, 782, 784) come from 'Ringingen', and the tumulus from Ulm-Eggingen was located in a forest tract named 'Ringingen'.

Whereas it seems probable that the nave fittings of types 'A' and 'B' came from, respectively, Emerkingen and Engstingen-Großengstingen, the case for Ulm-Eggingen and the 'C' nave fittings seems inconclusive. Nevertheless, the 'C' finds have been listed in the Ulm-Eggingen catalogue entry (see cat. no. 95).

Finds:

- 1) Bronze nave fittings, comprising a bronze nave-head ring with angular cross-section and a bronze covering from the nave-neck. The bronze sheet bears the remains of a raised rib at the end nearest the nave-stock. The seam of the bronze sheet nave sheathing was covered and fastened by a nailed bronze strip. (Pl. 33A, 2)
- 2) Iron tyres. Lost.
- 3) Painted sherds. (including Zürn 1987, pl. 37A, 2)
- 4) Wood, possibly from a wagon. Lost.
- 5) Human bones, ?cremated. Lost.
- 6) Hazel-nuts. Lost.

- 7) Iron dagger blade with three ribs. (Pl. 33A, 1; see also Miller 1893, 21, fig. 6)

Museum: Württembergisches Landesmuseum, Stuttgart.

61 Engstingen – Großengstingen

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Lindenschmit 1860, 137; von Föhr 1892, 23; Anon. 1893, 414; Paret 1935a, 23; Zürn 1987, 120–1, no. 8.

Description: This tumulus was excavated by Graf Wilhelm von Württemberg in 1853. Lindenschmit records the finds thus: 'the four halves from two wheels ... four well-made copper nave sheathings with iron nave-caps ... the wood of the felloes is still clearly recognisable, the nail heads on the tyres almost touched each other and cover the tyre surface'. The associated finds were: a large number of (bronze) rings, a small copper vessel, a crystal bead, and an iron 'Schelle'.

Comments: Von Föhr notes that in his day the finds were housed in the collection of the duke of Urach, but by the time when Paret wrote they had reached the Württembergisches Landesmuseum, Stuttgart. While Paret confined himself mainly to repeating Lindenschmit's report, he adds that the axle-channel was 50 mm in diameter. This implies that most of the finds from Großengstingen were already lost in 1935, but Paret did manage to find a nave-cap to measure. Among certain finds in the Württembergisches Landesmuseum without secure provenance there is, in fact, a fragmentary nave-cap whose axle-channel has a diameter of slightly less than 50 mm (about 46 mm) (Pl. 33B, 2), and a fragment of bronze nave-neck sheathing (Pl. 33B, 1), which probably come from this grave (for further details see cat. no. 60).

Finds:

- 1) Iron tyres with nail heads which almost touched each other and covered the tyre surface (probably type VC). Lost.
- 2) Fragmentary nave fittings of type Erkenbrechtsweiler, comprising part of an iron nave-cap and bronze nave-neck sheathing. The nave-neck was conical in shape and covered with bronze sheet, the seam of which was covered by a ribbed bronze band and a row of iron nails with spherical bronze heads. (Pl. 33B)
- 3) Bronze rings. Lost.
- 4) Bronze vessel. Lost.
- 5) Crystal bead. Lost.
- 6) Iron 'Schelle'. Lost.

Museum: Württembergisches Landesmuseum, Stuttgart.

62 Erkenbrechtsweiler, tumulus X

(Kreis Esslingen, Reg.-Bez. Stuttgart)

References: Steiner 1893, 30; Braun and Wetzel 1904, 358; Hertlein 1905, 384–386; Goessler and Baum 1908, 30 and pl. 6, 21; Goessler 1909, 139–141; Goessler 1924, 27; Paret 1935a, 21; Zürn 1956, 30–31; Fischer 1982, 105–110; Zürn 1987, 63.

Description: This tumulus was excavated by Witscher in 1893. The fullest description is that of Hertlein (1905), which has been used by most subsequent authors. In fact, this is limited to a list of the grave contents: 'bronze sheet nave sheathings ... a piece of gold jewellery ... three small bronze rings ... two drum fibulae (Paukenfibeln) ... and a pin'. These objects are also reproduced by Hertlein (1905, 386; 384, figure, nos 8, 10, 17, 18, 20, 21–inner and 22). Goessler (1924, 27) also mentioned an iron spearhead

belonging to this grave, but this remains the only report of a spearhead and it lies open to doubt. A further discrepancy is caused by the mention by Steiner (1893) of two wagons being found at Erkenbrechtsweiler, whereas every other author only mentions one. It may be that Steiner was confused by the report of two naves being found. A more important discrepancy is brought to light by the card-catalogue of the Württembergisches Landesmuseum, which assigns the two drum fibulae to tumulus II, grave 2 and records tumulus X containing the two serpentine fibulae which Hertlein assigned to tumulus II, grave 2. The pre-war inventory card states: 'Hertlein rechnet hierher (Hgl. II, Grab 2) nicht die (zwei Paukenfibeln), sondern die zwei Schlangenfibeln, die das Inv. dem Hügel X zuweist, wogegen umgekehrt Hertlein die zwei (Paukenfibeln) unter Hügel X erwähnt'. It is possible that Hertlein confused the fibulae from these two graves.

Comments: This tumulus was re-excavated in 1987. The excavators uncovered tyre nails and nave fragments from the central wagon burial, as well as a secondary grave with a fibula (Rehmet and Schmid 1987).

Finds:

- 1) Bronze and iron remains from the naves (type Erkenbrechtsweiler) of at least three wheels (Pls 33C, 3–8; 34, 2–5). The nave sheathings are conical and consist of an iron nave-cap, a bronze nave-head ring and a conical bronze nave-neck sheathing.
 - (i) the nave-caps have a conical, slightly concave profile, with thickened rim and flat external face. The axle-channel measures 45–55 mm in diameter.
 - (ii) five nave-head rings are fully preserved, one survives for two-thirds of its circumference, and there are further small fragments – i. e. the remains of at least three wheels. Two of the nave-head rings bear engraved decoration. The fully-preserved rings vary in diameter from 126–146 mm.
 - (iii) the conical nave-neck is 128–136 mm long, with a minimum diameter of 72–85 mm and a maximum diameter of 145–165 mm. The large end is decorated with three ribs, one of which is doubled in two cases (Pl. 34, 2–3). The bronze sheet is held together by six spherical-headed bronze nails, which also affix a ribbed bronze band which serves to cover the join. The bronze sheathing expands in a trumpet shape towards the nave-head, where it is then covered and held by the nave-head ring.
- 2) Iron tyres. Paret describes the tyres as being 24 mm wide with a domed cross-section, they were affixed by relatively few nails. He estimated a diameter of 850 mm. These are probably to be identified with a number of fragments in the Württembergisches Landesmuseum. However, the Erkenbrechtsweiler tyres have become mixed with those from Winterlingen, which are of the same type (type IIIG). (Pls 34, 1; 53, 2)
- 3) Sheet gold ear-ring with ribbed and beaded decoration. (Pl. 33C, 9)
- 4) Bronze pin with thickened end and bent shaft. (Pl. 33C, 13)
- 5) Two bronze serpentine fibulae (Schlangenfibeln), lengths 55 and 65 mm. Mansfeld assigns one to his type S4 and the other to his type S5 (Mansfeld 1973, 174, Fundliste 55; 178, Fundliste 67: 'Grabenstetten-Burrenhof'). (Pl. 33C, 1, 2)
- 6) Three small bronze rings, diameters 14, 18, and 25 mm. (Pl. 33C, 10–12).

Museum: Württembergisches Landesmuseum, Stuttgart (inv. nos 10449, 15h.i, and A.1199).

63 Filderstadt-Plattenhardt, 'im Weilerhau', tumulus 2
(Kreis Esslingen, Reg.-Bez. Stuttgart)

References: Paulus 1830, 42; Paulus 1859, 22; Paulus 1877b, 50; Paret 1935a, 20; Zürn 1956, 27; *ibid.* 1987, 67.

Description: In the forest 'Weilerhau' is a group of 28-30 tumuli, of which four were excavated by Paulus in 1830. Tumulus 2 contained a burnt surface and some iron and bronze wagon remains.

Finds:

- 1) Four fragments of iron nave-caps; external diameter 143 mm, internal diameter 58 mm. (Pl. 35B, 1)
- 2) Iron band, 45-46 mm wide, internal diameter 143 mm. Traces of one nail are visible. (Pl. 35B, 5)
- 3) Iron tyre nail with long head (length 52 mm). The original width of the tyre cannot be ascertained, but measured more than 22 mm. The shank of the nail is preserved for a length of 26 mm. (Pl. 35B, 6)
- 4) Two iron nails with spherical bronze heads (diameter 11-12 mm). The shanks of the nails are square in cross-section. (Pl. 35B, 3-4)
- 5) A third iron nail probably originally had a spherical bronze head; the shank of this nail carries traces of horizontal wood grain. (Pl. 35B, 2)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. A.3362).

64A Herbertingen - Hunderingen, 'im Waldteil Gießübel', tumulus 1, secondary grave 1
(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Paulus 1876; Paulus 1877a; Paulus 1878, 35-38; Lindenschmit 1881, Heft 10, pl. 1, 3; Paulus 1888, column 2; Hölder 1895, 52-54; Goessler and Baum 1908, 28-9; Reinecke 1911a, 144 and pl. 27, 466-474; Reinecke 1911b, 328-329 and pl. 56, 1033; Goessler 1923, 208ff.; Bittel 1934, 9-10; Paret 1935a, 23; Paret 1942, 76-77; Schiek 1956a, 43-58; Schiek 1959, 117-119; Sperber 1979, 35-39; Sperber 1980, 39-44; Sperber 1981, 43-49; Kurz 1982, 67-72.

Description: This is one of four large tumuli close to the Heuneburg situated in the forest tracts called 'Gießübel' and 'Talhau'. Tumulus 1 was destroyed in 1876, but the finds were carefully collected and sent to the Württembergisches Landesmuseum. Paulus excavated the remains of the tumulus in 1877 and was able to find the central primary grave chamber which contained, among other things, a serpentine fibula of Mansfeld's S5 type. Apart from the primary chamber grave found in 1877, five secondary graves were found in 1876, of which secondary grave 1 was the richest, containing remains of a wagon.

Concerning the wagon remains, tyres, nave parts and a 'small iron bowl' have been mentioned by various authors. These were all probably lost even before the war, judging from the cursory mention given to them by Paret (1935a, 23). Nevertheless, the tyre fragments have now been identified in the Württembergisches Landesmuseum. The 'iron bowl' referred to above was almost certainly an axle-cap, which is now lost. However, thanks to information kindly supplied by Dr S. Schiek, a plaster cast of this object in the Römisch-Germanisches Zentralmuseum, Mainz, has been identified, showing the original form of the axle-cap fragment (reconstruction: Fig. 72, 2). As for the nave itself, no remains survive in the Württembergisches Landesmuseum, but a further plaster cast from the Römisch-

Germanisches Zentralmuseum probably represents the external face of the nave-head.

In 1963 two sondages were excavated in tumulus 1, resulting in the discovery of another secondary grave and showing that tumulus 1, like tumuli 2 and 4, was built over the destroyed external 'suburb' settlement of the Heuneburg. Complete excavation of the tumulus was begun in 1980 and has uncovered a further 13 secondary graves. Sperber (1981, 43) estimates an original diameter of 46 m for the tumulus and a height of about 5 m.

Finds:

- 1) Iron axle-cap of type Wellenburg, comprising a hemispherical dome (diameter 63 mm) fitted with a horizontal flange, which is only preserved in traces on one side. The height of the axle-cap is ca. 45 mm. Traces of a round hole for the linchpin are also discernable (diameter 7.5 mm). The axle-cap is lost, but a plaster-cast survives in the Römisch-Germanisches Zentralmuseum, Mainz. (Fig. 72, 2; Pl. 35A, 2)
- 2) Flat iron ring, probably from the nave-cap. External diameter ca. 120-125 mm, internal diameter ca. 58 mm. This piece is lost, but a plaster-cast survives in the Römisch-Germanisches Zentralmuseum, Mainz. (Pl. 35A, 1)
- 3) 16 pieces of iron tyre of type VII, with a wide, slightly convex cross-section and slightly bent down sides; width 30 mm. The tyre is fitted every 200-250 mm with a large flat-headed nail (nail head ca. 20 x 20 mm, with no uniform shape discernable). Only the bases of the nails have survived. (Pl. 35A, 3-4)
- 4) Gold neck-ring, diameter ca. 230 mm. (Paret 1942, pl. 35, 4)
- 5) Openwork bronze belt-sheet. (Kilian-Dirlmeier 1972, pl. 47, 442)
- 6) Iron dagger with bronze scabbard. (Sievers 1982, pl. 34, 184)
- 7) Iron spearhead, length 397 mm.
- 8) Two more iron spearheads. Lost.
- 9) Iron socketed axe.
- 10) Two hemispherical bronze cup-shaped objects, each perforated at the top of the dome and penetrated by a bronze looped nail, with four other bronze rings hanging from the loop. (Goessler 1923, 210, fig. 11b: bottom, second from right)
- 11) Three bronze terminals. (*ibid.* fig. 11b: bottom left, top second and fourth from the left)
- 12) 21 bronze phalerae, diameter 89-97 mm, with a central bronze rivet furnished with a cup-shaped head. (*ibid.* 212, fig. 12, 3)
- 13) Four long bronze sheets, maximum length 170 mm, fitted with a loop of bronze wire at one end. The sides are slightly concave.
- 14) Two fragments of bronze sheet, length 76 and 132 mm.
- 15) Knife-shaped bronze pendant. (*ibid.* 212, fig. 12, 1)
- 16) Large ring-shaped bronze object, provided on the inside with four spokes and on the outside with four 'toggles'. (*ibid.* 210, fig. 11b: middle)
- 17) Two bronze rings fitted with bronze 'toggles'. (*ibid.* 210, fig. 11b: middle upper left; middle upper right)
- 18) Similar, smaller toggled ring cast together with a bronze hemispherical cup. The hemispherical cup is provided with a horizontal internal bar. (*ibid.* 210, fig. 11b: top row middle)
- 19) Two large hemispherical cups, each provided with a looped nail, which is connected by a number of rings to a

rectangular rein fitting. (ibid. 210, fig. 11b: lower left and right)

20) Fragmentary bronze cauldron. Lost.

21) Sherds. Lost.

22) 'Horse bones'. Lost.

Museum: Württembergisches Landesmuseum, Stuttgart (tyre fragments: inv. no. 8721).

64B Herbertingen – Hundersingen, 'im Waldteil Talhau', tumulus 4, central primary grave

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Schiek 1959; ibid. 1985.

Description: This tumulus, measuring 52 m in diameter and 3.8 m in height, was excavated by S. Schiek in several campaigns from 1954 onwards. The most important result of the excavation was the discovery of part of the destroyed external 'suburb' settlement of the Heuneburg. The primary grave of the tumulus was positioned within the central room of a destroyed house (room 3) and then covered by the tumulus. The grave chamber (internal measurements 2.8 × 3.4 m, and 800 mm high) was robbed in antiquity. The robbery occurred at most a few years after the burial – as shown by the skeleton which, although moved by the robbers, remained largely intact, only losing a few extremity bones (Schiek 1959, 128). A few finds were left by the robbers, including the wagon's iron spoke-sheathings. The spokes had been chopped off with an axe, in order to be able to extract the iron tyres and nave fittings from the grave (personal communication from S. Schiek). The excavations also uncovered 13 secondary burials, of which one was provided with two serpentine fibulae (*Schlangenfibeln*), of type S5 (secondary grave 12: Mansfeld 1973, 179, list 69).

Finds:

- 1) 17 ribbed iron spoke sleeves and 67 small fragments of such sleeves. Most of the sleeves have three ribs, but some have four. One spoke sleeve has a conical end and was probably used for the base of the spoke. The sleeves vary in diameter from 32–46 mm, which shows that the spokes tapered. None of the sleeves shows a join or seam and they were each probably beaten from a single piece of iron sheet. Schiek mentioned that each spoke was provided with three spoke sleeves (ibid. 1956a, 187). (Pl. 37A)
- 2) Fragment of iron sheet, curved in cross-section. (Pl. 36, 11)
- 3) Fragment of an iron ring, flat in cross-section with the sides bent down. The ring was about 83 mm in external diameter and about 46 mm in internal diameter. (Pl. 36, 12)
- 4) Two iron rein-knobs with profiled central boss and flat flange. Both the rein-knobs originally had two loops at the back. Diameters 34 and 42 mm. (Pl. 36, 32.37)
- 5) Nine flat iron rein-knobs and fragments. The rein-knobs are about 20 mm in diameter, with a single loop at the back, some with remains of the leather reins. (Pl. 36, 39–45)
- 6) Two cast bronze rein-ornaments with ribbed decoration. (Pl. 36, 34–35)
- 7) Three fragments of iron cylindrical flanged objects. (Pl. 36, 17.22.27)
- 8) Two fragmentary iron strips, each with a row of slightly raised black 'blobs' (of silver or bronze?). (Pl. 36, 23–24)
- 9) Cast bronze toggle. (Pl. 36, 38)
- 10) Fragment of an iron (?belt-) hook. (Pl. 36, 25)
- 11) Bronze fitting from the end of a belt, consisting of a bronze strip, five spherical-headed rivets and two hooks. (Pl. 36, 18)

12) Bronze nail head. (Pl. 36, 19)

13) Five fragmentary solid iron spheres, each with a bronze rivet on its base and a decorative bronze band with 'D'-shaped cross-section. (Pl. 36, 5–9)

14) Three fragments of circular lumps of solid brown mass, with central perforation. The 'lumps' are bound with a finely-profiled iron band, which is surmounted by a central bronze band with 'D'-shaped cross-section. (Pl. 36, 1–3)

15) Hollow iron hemispherical object with ribbed base. (Pl. 36, 4)

16) Small fragment of iron with 'C'-shaped cross-section. (Pl. 36, 14)

17) Six fragments of iron sheet with thickened edges. (Pl. 36, 26)

18) Two iron nails with large heads. (Pl. 36, 30–31)

19) Solid iron ring. (Pl. 36, 21)

20) Hollow iron ring. (Pl. 36, 20)

21) Iron fragment, possibly from a phalera or decorative button. (Pl. 36, 33)

22) Two fragments of curved iron, with iron knob-like protrusions; possibly fragments of an iron dagger chape. (Pl. 36, 28–29)

23) 10 fragments of iron strips. (Pl. 36, 13)

24) Six fragments of iron bands, one with a nail. (Pl. 36, 15)

25) Two fragments of iron sheet, bent over with a right-angled profile. (Pl. 36, 16)

26) Four fragments of ribbed iron sheet, one with a nail fragment. (Pl. 36, 36)

27) Fragment of an iron rod; where the rod is best preserved, the cross-section is round. (Pl. 36, 10)

28) 53 small fragments of iron sheet and iron nails.

29) Six small pottery sherds.

Museum: Württembergisches Landesmuseum, Stuttgart.

65 Herbertingen – Hundersingen, 'Lehenbühl'

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Bach 1897, 2–3; Nägele 1898, 39; Goessler 1923, 216–218; Schiek 1956a, 68–69.

Description: A large tumulus, 70 m in diameter and 5–6 m high, situated 900 m N of the Heuneburg, was excavated in 1897 by J. Dorn. In the centre of the tumulus, sunk 1.5 m into the natural soil, was a wooden chamber grave with sides measuring 2 × 2 m. Above the chamber Dorn found six post-holes, which he thought may have been associated with some sort of roofing. The grave contained the remains of an inhumation, a serpentine fibula of Mansfeld's S4 construction, a bronze rein-knob, a fragment of an iron knife and an iron fragment probably from an iron tyre. The grave was certainly robbed some time prior to the excavations of 1897.

Finds:

- 1) Iron fragment, probably from a tyre, length 66 mm. Only one side is preserved and shows a flattish profile. The inside of the tyre shows remains of wood grain. (Pl. 37B, 1)
- 2) Two bronze rein-knobs. The flat disc of the knob has a diameter of about 24 mm, and is provided with a loop on the back. One knob is lost. (Pl. 37B, 4)
- 3) Bronze serpentine fibula, consisting of the foot, most of the bow and a circular bronze disc. (Pl. 37B, 2)
- 4) Three fragments of an iron knife, length of longest fragment 60 mm. One fragment lost. (Pl. 37B, 3)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. 11161).

66A Hohenstein – Oberstetten, tumulus 1

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 44–45; Lindenschmit 1900, pl. 44; Goessler 1912, 221; Paret 1935a, 24; Zürn 1987, 136.

Description: This tumulus was excavated by J. Dorn in 1886 (diameter 20 paces, height 1.2 m). The excavator found a secondary grave (with arrowhead, spearhead, and bronze belt-sheet) and a primary chamber grave. In the N corner of the wooden chamber was an 'iron cauldron', 800–900 mm high and 700–800 mm in diameter. In the middle of the chamber was a pile of cremated bone and an iron Hallstatt sword. S of the cremation were the sherds of four pottery vessels. In the E corner of the chamber was a 'wooden shield covered with leather and furnished with bronze bosses' (1 m long, 500 mm wide at one end, and 150 mm wide at the other) with '...Bronzeperlen zu vielen Hunderten am Rande des Schildes umher und auf die ganze untere Hälfte des Schildes gesetzt und hier durch größere Bronze Knöpfe in Dreiecke geschieden gewesen seien. In der Mitte der oberen Hälfte sei der Schildbuckel in Form eines verzogenen Vierecks von Holz und Leder angebracht und mit Bronzeperlen und 4 großen Bronze Knöpfen in den Ecken verziert gewesen' (von Föhr 1892, 45). Under the 'shield' were two small bronze rings and fragments of iron. Iron fragments were found throughout the tumulus (Fig. 168).

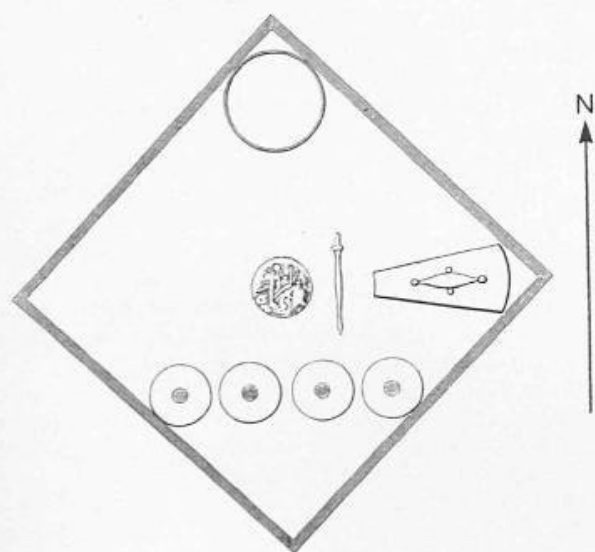


Fig. 168 Hohenstein-Oberstetten, tumulus 1: plan of the grave chamber (after Lindenschmit 1900). – Not to scale.

Comments: Dorn conducted a very amateurish excavation, and interpretation of the results is beset with problems. However, the description of the 'shield' by von Föhr (quoted above), particularly the 'many hundreds of small bronze buttons' and the large bronze bosses arranged in triangles and rhombus shapes, implies that we may be dealing with a decorated yoke. As for the 'iron cauldron', its diameter of 700–800 mm gives rise to the suspicion that Dorn actually found remains of iron tyres, although the height of the 'iron cauldron' (800–900 mm) would not support this interpretation. Finally, the bronze serpentine fibula, said by Lindenschmit to come from the chamber grave, is not mentioned in von Föhr's description of the grave contents and it will not be included in the catalogue below (it probably belonged to the secondary grave).

Finds:

- 1) 'Iron cauldron', 800–900 mm high, 700–800 mm in diameter. Lost.
- 2) Iron sword, original length ca. 720 mm. Only a few fragments survive. (Pl. 37E, 1)
- 3) Four pottery vessels. Two lost. (Lindenschmit 1900, pl. 44, 1; Zürn 1987, pl. 243, 1–2)
- 4) Many hundreds of small bronze buttons. Lost.
- 5) Five large bronze sheet buttons, with a horizontal cross-bar at the back; diameter 31–33 mm. (Pl. 37E, 2–4)
- 6) Two small bronze sheet decorative buttons, 15 mm in diameter. (Pl. 37E, 5.6)
- 7) Bronze rings, mostly with angular cross-section, seven in the Württembergisches Landesmuseum, with diameters of 47 (2), 37 (2), 28, 27, and 25 mm. Four of the rings are lost. (Pl. 37E, 8–10)
- 8) Bronze ring provided with two nails, diameter 12 mm. (Pl. 37E, 7)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. nos A. 3326, 1–4.6–10.12).

66B Hohenstein – Oberstetten, tumulus 2

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 44; Goessler 1912, 221; Zürn 1987, 136.

Description: This tumulus was excavated by Von Föhr in 1886. The central grave was 430–570 mm deep, with a large burnt layer, numerous strips of totally rusted iron (tyres?), and a number of sherds (from which four vessels could be reconstructed). There was also a quantity of iron nails. Von Föhr suggested that the central grave may have been robbed. The excavations also uncovered three secondary graves.

Comments: The report of rusted iron strips and iron nails suggests that the grave may have contained iron tyres. However, as these are not preserved in the Württembergisches Landesmuseum, no definite conclusions can be reached.

Finds:

- 1) Three iron nails. (Pl. 37C, 2.4.5)
- 2) Remains of rusted iron strips (tyres?). Lost.
- 3) Ribbed iron objects, probably originally with a half-cylindrical shape. According to a note in the public exhibition of the Württembergisches Landesmuseum, the ribs of the socket-shaped objects were attached by bronze solder. (Pl. 37C, 1.3)
- 4) Four pottery vessels. (Zürn 1987, pl. 244B, 1–4)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. A.3325).

67 Hohenstein – Ödenwaldstetten

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Hedinger 1903, 185–186; Zürn 1943, 21; *ibid.* 1987, 135–6.

Description: This tumulus, 10 m in diameter and 0.5 m in height, was excavated in 1900–1901. In the middle of the tumulus was a stone core measuring 3 × 2 m. Two secondary inhumations were found, one under and one in the stone core, and on the base of the tumulus was a primary cremation. Nine pottery vessels were found in the primary grave (one of which contained 'ash remains' – probably an in-urned cremation), as well as 'several pieces of a tyre and large nails' and the skeleton of a boar.

Finds:

- 1) Three iron tyre fragments of type II. One tyre nail has a shank still preserved with a length of 80 mm. Another tyre fragment shows the original profile of the tyre. The nails are rectangular in cross-section. (Pl. 37D)
- 2) Two decorated conical-necked vessels (*Kegelhalsgefäße*). (Zürn 1987, pls 239, 4; 240A, 1)
- 3) Two small pottery bowls. (ibid. pl. 239, 1–2)
- 4) Two pottery cover-bowls. (ibid. pl. 241, 1–2)
- 5) One large graphited pottery urn. (ibid. pl. 239, 3)
- 6) One decorated shallow pottery bowl. (ibid. pl. 240A, 2)
- 7) One smaller urn with decoration on the neck.

Museum: Universitätsammlung, Institut für Vor- und Frühgeschichte, Tübingen (inv. nos 337–344 and 347).

68 Hügelsheim, 'Heiligenbuck'

(Kreis Rastatt, Reg.-Bez. Karlsruhe)

References: Schick 1981.

Description: The 'Heiligenbuck' was excavated by E. Wagner from the 25th October to the 10th November 1880. It had been disturbed before, particularly in 1845, when the top of the tumulus was removed and the land-owner excavated to a depth of 2–2.3 m, finding a heap of stones, an iron 'pan', and some other objects. In 1883, the tumulus measured 70–74 m in diameter with a height of 3–3.5 m.

Wagner's excavations concentrated on a circular area (6 m in diameter) in the middle of the tumulus. He found a wooden grave chamber measuring 4 × 2 m (orientated NW-SE), and sunk 1.5 m into the old ground surface. Remains of the chamber's wooden planks survived, and Wagner noted that they were covered with bronze sheet. The wooden chamber was partly surrounded by stone walling. In the SE part of the chamber were strewn wagon parts, and among them was a human lower jaw bone and a bronze half-cylinder. Some finds were discovered above or outside the grave chamber – small round bronze knobs, a 'small ribbed bronze handle, possibly from a vessel', a spoke, and a piece of leather.

Comments: Schick suspects that the chamber may originally have extended over the whole area under the stone core (thus ca. 4.5 × 3.2 m). As for the bronze sheet on the chamber walls, he suggests that it was only an iron compound ('vivianite'). He concluded that the grave had been robbed. One spoke which seems to have been hacked off, perhaps with an axe (Schick 1981, 281, fig. 6, 5) implies that the grave was robbed shortly after the burial. On the other hand, the many small fragments of bronze sheet speak for a later robbery or disturbance.

Finds:

- 1) Fragmentary nave fittings of type Vilsingen (reconstructed, according to Schick's proposal, on Pl. 38, 2), comprising:
 - (i) iron nave-stock ring, width 18–19 mm, bearing linear and dot-and-circle decoration in inlaid bronze. A piece of bronze sheet nave-neck sheathing is preserved on the rear of one fragment. (Pl. 38, 3)
 - (ii) iron nave-head ring, angular in cross-section, the outer side bearing linear and dot-and-circle decoration in inlaid bronze; diameter ca. 130 mm. (Pl. 38, 11)
 - (iii) bronze nave-head sheathing. (Pl. 38, 11)
- 2) Iron nave-cap, with thickened internal rim; external diameter 118 mm, internal diameter ca. 64 mm. (Pl. 38, 1)
- 3) Remains of spokes, made from hornbeam. None of the fragments is preserved to its full length. Two fragments show the original round cross-section. Slight traces remain

- from the original bronze sheet spoke sheathing which was nailed to the spokes. One fragment was hacked off diagonally, perhaps with an axe (Pl. 38, 9). (Pl. 38, 4.8–10)
- 4) Numerous small fragments of iron tyres, ca. 24 mm wide. The nails (type VC) were large and rectangular (ca. 38 mm long), and were closely spaced. On one fragment remains of the wooden felloe are preserved, showing that it was made of ash. (Pl. 38, 6.7)
- 5) Bronze half-cylinder bearing six ribs. Both of the ends of the half-cylinder are closed. Length 78 mm. (Pl. 38, 5)
- 6) Two fragmentary bronze rings, on the back of each of which was a pair of nails. (Schick 1981, 283, fig. 8, 6.7)
- 7) Remains of horse-gear: fragmentary iron horse bit (ibid. 282, fig. 7, 1); two iron rods, on one end of each sits an iron disc, lengths 52 and 55 mm (ibid. 282, fig. 7, 2.3); small iron cylindrical socket with remains of a disc-shaped head (diameter 20.3 mm), length 23.5 mm (ibid. 280, fig. 5, 4); fragment of an iron ring, onto which are fastened remains of a leather rein with a hemispherical bronze rein-knob (ibid. 282, fig. 7, 7); remains of four iron rings, three of which are rusted together, diameter 32–38 mm (ibid. 282, fig. 7, 4.5); bronze disc with rich decoration and a thick loop on the rear side (ibid. 283, fig. 8, 18); various bronze decorative knobs, always with loops at the rear: simple hemispherical knobs, knobs with double, triple or more bosses, circular knobs, or square knobs with openwork decoration (ibid. 283, fig. 8, 1–3.10–15); two fragments from the rim of a bronze sheet disc, possibly a phalera, diameter ca. 180 mm (ibid. 282, fig. 7, 9.10).
- 8) Personal goods: fragment of a bronze dagger hilt (ibid. 283, fig. 8, 17); fragmentary bronze serpentine fibula of Mansfeld's type S4 (ibid. 283, fig. 8, 19).
- 9) Bronze vessels: two fragments of a bronze bowl with horizontal rim, the rim bears bossed decoration (ibid. 282, fig. 7, 13); two fragments of a bronze ribbed bucket (ibid. 282, fig. 7, 11); two fragments of a bronze handle, probably from a 'Kännchen mit Rinderkopfschenkel' (ibid. 282, fig. 7, 8); fragment of an iron ring with square cross-section, diameter ca. 90 mm (Schick argues that this came from a bronze cauldron with iron ring-attachments; ibid. 282, fig. 7, 12).
- 10) Miscellaneous goods: fragment of a bronze disc-shaped object with a projection, on which sits a hemispherical-headed bronze nail (ibid. 283, fig. 8, 16); fragment of a bronze ring with triangular cross-section (ibid. 283, fig. 8, 9); two small bronze rings rusted together (ibid. 283, fig. 8, 8); two fragmentary thin bronze objects with 'U'-shaped cross-section (ibid. 283, fig. 8, 20.21); small fragment of bronze sheet with small bronze nails (ibid. 283, fig. 8, 4); small fragment of a bronze band (ibid. 283, fig. 8, 5); two small bronze spheres, each with a broken bronze rod-shaped projection (ibid. 283, fig. 8, 22.23); iron cylindrical object – either made from three rings rusted together or with three ribs (ibid. 282, fig. 7, 6); small fragments of wood, leather and textiles; a few bones from a young pig (it is uncertain whether they come from this grave chamber).

Museum: Badisches Landesmuseum, Schloß, Karlsruhe.

69 Igersheim – Simmringen, 'Bürzel'

(Main-Tauber-Kreis, Reg.-Bez. Stuttgart)

References: Goessler 1916, 12; Paret 1935a, 25; Zürn 1987, 104. Unpublished manuscripts by G. Bersu, in the Landesdenkmalamt Baden-Württemberg, Stuttgart.

Description: The tumulus called the 'Bürzel' was excavated by Bersu in 1914. The stone circle surrounding the central grave, 30–32 m in diameter, probably marked the circumference of the tumulus. The central grave chamber was covered by a stone setting roughly 8.0–8.5 m in diameter. The stone setting was discovered by ploughing and this may explain why the results of the excavation are so confused. From the unpublished plan of the tumulus, it may be possible to discern a grave in which the inhumation was positioned to the N of the wagon. The manuscript lists the following finds: human and horse bones, six naves, horse-gear, sherds and bronze remains.

Paret (1935a, 25) provided further details concerning the wagon parts. He listed three iron nave sheathings and remains of a fourth. The naves were described as having an external diameter of 130 mm, an axle-channel diameter of 60–70 mm and a width of 55–60 mm. Paret suggested that the grave had been robbed, and this would explain the paucity of finds. Judging from Paret's description, some wagon parts have been lost since his article appeared.

Finds:

- 1) Five fragments of iron sheet from cylindrical nave sheathings, probably of type Repperndorf. (Pl. 39A, 1)
- 2) One fragment of the iron nave-cap. (Pl. 39A, 2)
- 3) Three iron rods with iron rings attached. (Pl. 39A, 4.9.12)
- 4) Two iron rods. (Pl. 39A, 8.13)
- 5) Looped iron rod. (Pl. 39A, 7)
- 6) Two fragments of iron rings, in one case provided with a loop, which still carries remains of an attached chain. (Pl. 39A, 5–6)
- 7) Large iron ring, diameter ca. 70 mm, with five loops, each of which carries an iron knob. Two of these knobs are still attached to short looped iron rods which in turn carried iron chains. Each link of these chains is formed from two iron rings. (Pl. 39A, 3)
- 8) Two chain fragments. (Pl. 39A, 10.14)
- 9) Further chain fragments, the largest of which is 110 mm long.
- 10) Remains of a hollow iron spherical object, pierced by an iron rod. At one end the rod is attached to a flat piece of iron sheet. The sphere is made of iron sheet, 2–3 mm thick. (Pl. 39A, 11)
- 11) Undecorated sherds, including rim-sherds. Lost.
- 12) Slight bronze 'spiral' remains. Lost.
- 13) Human bones. Lost.
- 14) Horse bones. Lost.

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. A.863).

70A Immendingen – Mauenheim, tumulus M, grave 3 (Kreis Tuttlingen, Reg.-Bez. Freiburg)

References: Aufdermauer 1963; Wamser 1972, 60–67; Bittel et al. 1981, 405–406.

Description: This cemetery of 23 tumuli was totally excavated in 1957–58 and 1967–69. The first 12 tumuli excavated were published by J. Aufdermauer (1963), the remaining 11 are described in the dissertation of L. Wamser (1972). The excavations uncovered 98 burials, of which 26 were in central tumulus graves, 61 were in secondary tumulus graves and 11 were in flat graves. The graves belong to the phases Ha C and D. The two wagon-graves (tumulus M, grave 3 and tumulus N, grave 3) were in the two large tumuli at the E end of the cemetery (Aufdermauer 1963, plan 1).

The wagon-grave in tumulus M was in the centre of the tumulus, in a rectangular grave pit (3.0 × 3.5 m) orientated SE-NW. The floor of the grave pit was ca. 1.6 m below the top of the tumulus. The burial was housed in a wooden chamber, which was covered by a stone packing. On the base of the grave pit were two parallel gulleys, which were probably impressions of two timbers from the wooden grave chamber (Fig. 169).

The inhumation was in the W half of the chamber, orientated (head)SSE-NNW(feet). On its left lower arm was a sapropelite barrel-shaped arm-band. By the right lower arm were a few bronze remnants, probably from a hollow arm-ring. On the pelvis were a few fragments of bronze belt-sheet decorated with 'rocker' engraving (*Tremolierstich*), and part of a leather belt adorned with tiny bronze buttons. Alongside was a fragment of a perforated bone rod (possibly part of some sort of pendant jewellery). Roughly in the area of the head were two bronze pins with small solid heads and further to the SE were two bronze hollow-headed pins (*Zweischalennadeln*, a third hollow-headed pin was found in a disturbed context).

In the E part of the chamber lay the remains of a wagon. Three wheels were visible to the excavators. The wheels had a diameter of ca. 850 mm, but were not provided with tyres. According to the remaining wooden remains, the wheels had eight spokes. Among the metal finds from the chamber were some which may form parts of horse-gear. These include a number of iron rings, an iron 'omega-clip' and four small disc-headed sockets (possibly the terminals of the check-pieces).

In the NE corner of the grave were some pig bones. The grave chamber also contained the sherds of two pottery vessels.

Wagon finds:

- 1) Fragments of iron nave fittings (a variant of type Repperndorf), consisting of a cylindrical nave-head (113 mm in diameter), a cylindrical nave-neck (84 mm in diameter) and a curved facing for the nave-stock. The nave fittings also include a nave-cap with an axle-opening 58 mm in diameter. (Pl. 39B, 3.4)
- 2) Two large, fragmentary iron sockets with iron disc-shaped heads. The socket is not set in the centre of the disc-head and is joined to the head by a gold coloured solder (probably bronze). (Pl. 39B, 1.2)
- 3) Various small fragments of iron sheet, of undiagnostic type, some of them probably from the wagon. These include two triangular looped iron pendants (lengths 71 and 77 mm), which may have formed part of the wagon decoration (? on wooden linchpins), or of the horse-gear.

Museum: Hegau-Museum, Singen (wagon parts: inv. nos Do 68/54:3 and Do 68/61:3).

70B Immendingen – Mauenheim, tumulus N, grave 3 (Kreis Tuttlingen, Reg.-Bez. Freiburg)

References: Aufdermauer 1963; Wamser 1972, 86–98; Bittel et al. 1981, 405–406.

Description: For a description of this cemetery, see the preceding catalogue entry.

Tumulus N was almost levelled and the stone packing of grave 3 was found immediately under the turf in the centre of the tumulus. The stone packing, at least 600 mm thick, was in the top of a rectangular grave pit measuring 4.0 × 4.5 m, orientated SE-NW. The pit contained a rectangular grave chamber made of drystone walling (Fig. 170). In three places remains of timbers were found on top of the drystone walls, 500–600 mm above the floor of the pit, showing that the chamber was covered by a

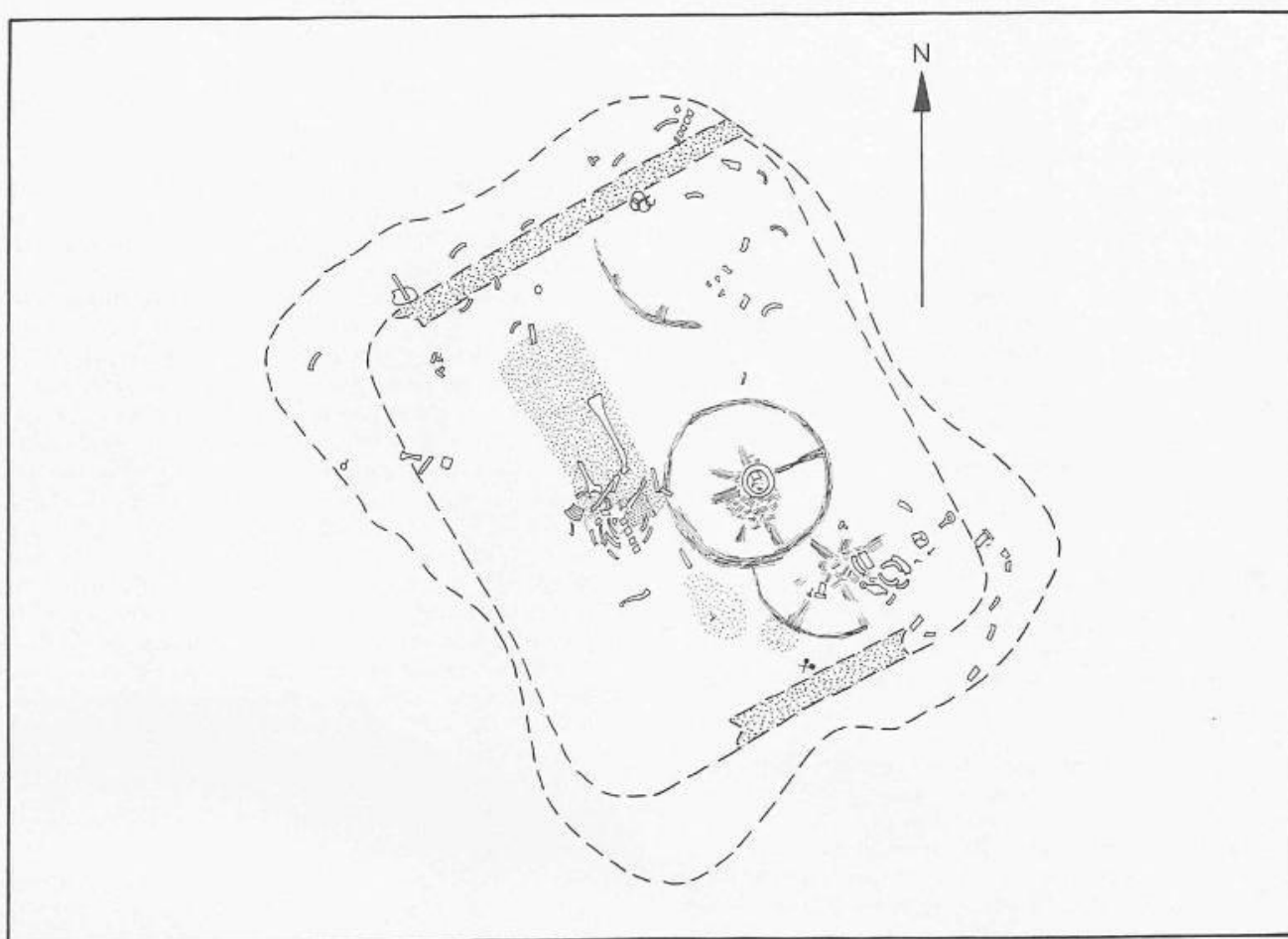


Fig. 169 Immendingen-Mauenheim, tumulus M, grave 3: plan of the grave chamber (after Wamser 1972). – Scale 1:40.

wooden roof. The grave floor was much disturbed and few of the finds were *in situ*.

The inhumation was found in the SW part of the grave, orientated (head)SE-NW(feet). At the left side of the body were the remains of an iron sword; Wamser (1972, 91) suggests it was an antenna-hilted sword, the original length of which was about 600 mm. In the chest area, the inhumation had two fibulae: a large iron serpentine fibula of S4 construction (ca. 110 mm long) and remains (pin and spiral) of a small bronze fibula. To the W of the sword, near the SW wall of the chamber, was a horizontal block of earth with remains of very fine decoration – probably remains of a decomposed wooden object, circular in shape with a diameter of at least 500 mm.

In the NE part of the chamber were remains of a four-wheeled wagon, including wooden remains possibly from the wagon-box. According to Wamser (1972, 88), the position of the wagon parts implies that the wagon was put in the grave intact (not dismantled). There were no traces of iron tyres.

Alongside the wagon, near the NE side of the chamber, were remains of the horse harness. This included an iron toggle, two large iron rings, part of an iron chain with seven rings (each 18 mm in diameter), an iron loop with split end (possibly a form of 'omega-clip') and four thick bronze rings, two of which were looped together. Also found were two small bronze sockets (19 mm high), the disc-shaped heads of which had a central perforation.

At the NW edge of the grave pit, outside the stone chamber wall, was a pig's skeleton.

Wagon Finds:

- 1) Remains of bronze and iron nave fittings, probably of type Winterlingen. The reconstruction of the nave-head is problematical, but it seems to have consisted of a nave-head ring and an outer nave-cap. The nave-head fittings only survive in very small fragments and the reconstruction remains incomplete. The nave-neck was sheathed in bronze sheet, of which four fragments survive. The edge of the nave-stock is bordered by an iron nave-stock ring with 'C'-shaped cross-section, with inlaid bronze decoration. (Pl. 40A, 1.5)
- 2) 10 fragments of curved iron sheet with horizontal wood grain; one of the fragments has the stump of a nail. Possibly remains of felloe-clamps. (Pl. 40A, 4.7.8)
- 3) Remains of an iron socket with disc-shaped head. Diameter of disc 43 mm, diameter of socket 28 mm.
- 4) At least 26 felloe nails with large square heads. Some of the nails are bent over and show a penetration of 60–68 mm. (Pl. 40A, 9)
- 5) 63 circular decorative rings each with two nails at the back (only one has three nails). Each of the rings was provided with a small bronze hemispherical-headed central nail. Some of the decorative rings and nails were found in remnants of wood, the longest of which was visible for a length of about 140 mm, with a width of up to 25 mm, and at least 16 mm thick. This strip of wood had four rings-with-nails, spaced 20 mm apart. (Pl. 40A, 2.3.6)

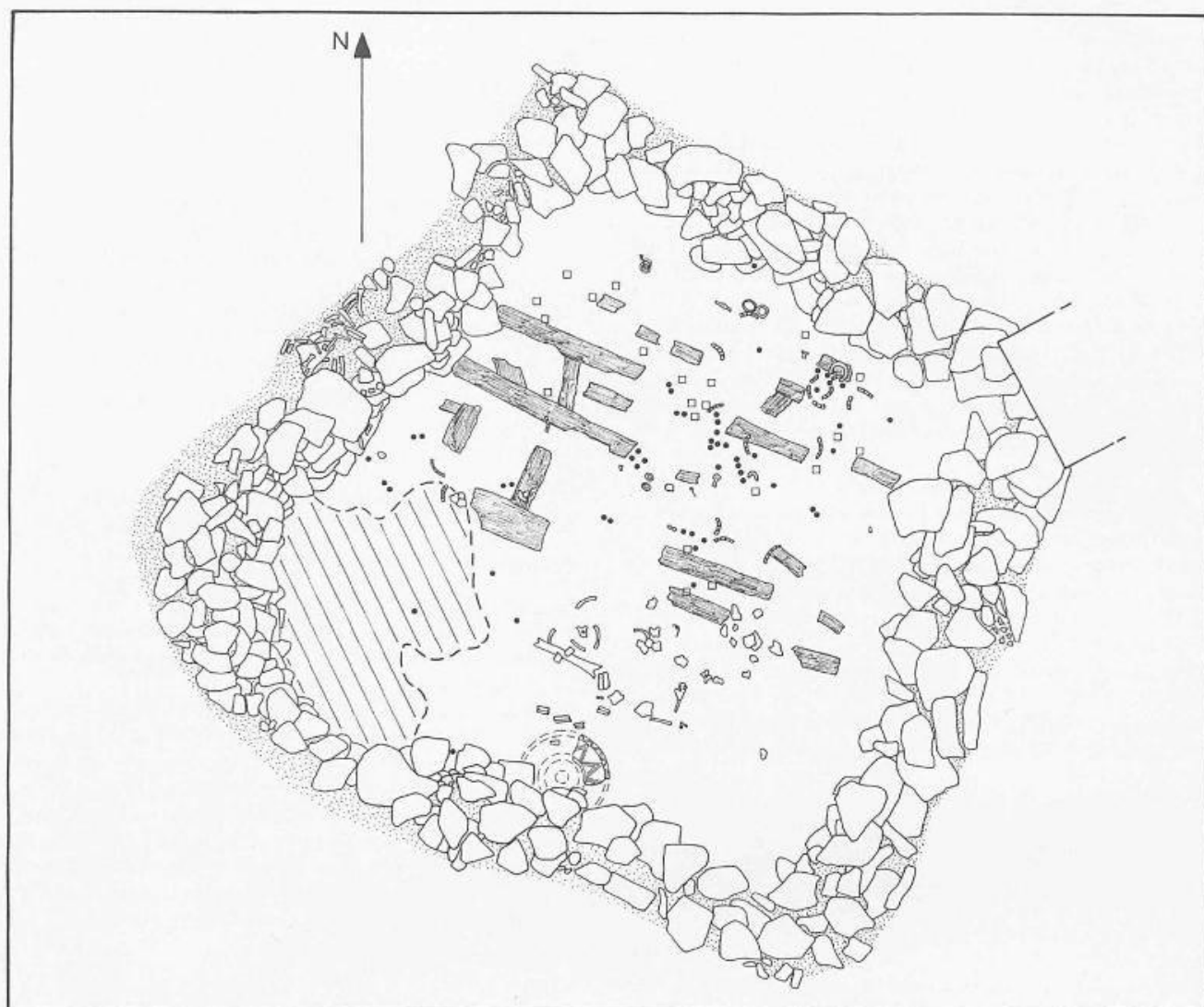


Fig. 170 Immendingen-Mauenheim, tumulus N, grave 3: plan of the grave chamber (after Wamser 1972). – Scale 1:40.

Museum: Hegau-Museum, Singen (wagon parts: inv. nos Do 68/120:3; 128:3; 131:3).

71 Inzigkofen – Engelswies

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Paret 1935a, 24.

Description: In the museum of Sigmaringen are three fragments of iron tyres. Nothing is known of the excavations.

Comments: Paret confused this find with Meßkirch-Langenhart, 'Haggenberg'.

Finds:

- 1) Three fragments of iron tyres of type VC, width 23 mm, with large-headed nails (nail heads ca. 40–42 × 15 mm) which are spaced so close together that they touch each other. (Pl. 40B)

Museum: Fürstlich Hohenzollernsches Museum, Sigmaringen (inv. no. 443).

72 Inzigkofen – Vilsingen

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Paret 1935a, 22; Schick 1954; Zürn 1987, 177–80.

Description: No information is available about the excavation, around 1880, of these finds, published by S. Schick in 1954. Schick notes that the quantity of finds (six bronze vessels !) makes it possible that they come from more than one burial, or even more than one tumulus.

Comments: The wagon components almost certainly derive from a single vehicle. The author was not able to draw the wagon finds from Vilsingen, owing to their poor state of conservation in Sigmaringen Museum. However, they have been well published by S. Schick. The catalogue of finds is derived from his publication and Dr Schick kindly provided the author with his drawings of the finds.

Finds:

- 1) Iron tyres of type VC, 25 mm wide, with large closely-spaced rectangular nail heads (measuring 50 × 15 mm). The tyres measure ca. 800–850 mm in diameter. (Pl. 41A, 4)

- 2) Wooden spokes, round in cross-section, covered with bronze sheet. Complete length at least 310 mm. The bases of the spokes have ca. 50 mm long tenons to fit into rectangular sockets in the naves. (Schiek 1954, pl. 25, 9; Zürn 1987, pl. 351, 4)
- 3) The naves (type Vilsingen) are formed from a complex nave-head, a bronze-clad conical nave-neck and a small nave-stock ring. The nave-head had a large iron nave-head ring decorated with linear inlaid bronze decoration and inlaid bronze dots-and-circles. Between the nave-head ring and the iron nave-cap there was a narrow section sheathed with bronze sheet. The end of the nave was formed by the iron nave-cap, with an axle-channel 36 mm in diameter. The bronze sheet cover of the nave-neck was fastened to the wooden nave by a row of flat-headed bronze nails. The iron nave-stock ring had thickened sides and was decorated with inlaid bronze dots-and-circles. Total length of nave, ca. 440 mm. (Pl. 41A, 3)
- 4) Four bronze axle-caps of type Wijchen, each with engraved dot-and-circle decoration. Each one had an iron linchpin with a spherical bronze head. (Fig. 72, 13; Schiek 1954, pl. 24, 1-6; Zürn 1987, 178, fig. 76, 1-5)
- 5) Two cast bronze disc-headed sockets. The disc-shaped head is decorated with engraved dots-and-circles. Total height 34 mm. (Pl. 41A, 5)
- 6) Two cast bronze heavily profiled spools, diameter 42 mm. (Pl. 41A, 8-9)
- 7) Two bronze half-cylinders, each with four ribs. One end of the half-cylinder is closed, the other is open. Length 42 mm. (Pl. 41A, 1-2)
- 8) Four hollow-cast bronze hemispherical knobs, each with a central rivet hole. Diameter 25 mm. (Pl. 41A, 6-7)
- 9) Thick bronze ring, internal diameter 6 mm, external diameter 26 mm. (Schiek 1954, pl. 25, 6; Zürn 1987, pl. 351, 10)
- 10) Two looped iron rods, preserved length 57 mm. (Schiek 1954, pl. 25, 2-3)
- 11) Fragments of a bronze 'Rhodian' flagon. (ibid. 153, fig. 2; pls 22, 1-4; 23, 1-2; Zürn 1987, pl. 352)
- 12) Fragments of two large bronze cauldrons. (Schiek 1954, 152, fig. 1; Zürn 1987, pl. 353, 1-2)
- 13) Sheet bronze cup with ribbed bronze handle. (Schiek 1954, 154, fig. 3, 12; pl. 23, 3; Zürn 1987, pl. 354, 1)
- 14) Sheet bronze handle-less cup. (Schiek 1954, 154, fig. 3, 11; pl. 23, 4; Zürn 1987, pl. 354, 2)
- 15) Fragment of another sheet bronze cup. (Schiek 1954, 154, fig. 3, 13; Zürn 1987, pl. 354, 3)
- 16) Fragments of two bronze dishes with horizontal rims decorated with point-bosses. (Zürn 1987, pl. 353, 3-4)
- 17) Large iron knife. (Schiek 1954, pl. 25, 1; Zürn 1987, pl. 355A, 1)
- 18) Two decorated cast bronze arm-rings with seal-shaped ends and engraved decoration. (Schiek 1954, pl. 23, 5-6; Zürn 1987, pl. 354, 4-5)
- 19) Two leather fragments.
- 20) Five pottery vessels and sherds of others. (Schiek 1954, 154, fig. 3, 6-10; Zürn 1987, pl. 355A, 2-6)

Museum: Fürstlich Hohenzollernsches Museum, Sigmaringen (inv. nos 1312-1349).

73 Jettingen - Oberjettingen, tumulus 3

(Kreis Böblingen, Reg.-Bez. Stuttgart)

References: Zürn 1956, 20; Anon. 1957; Zürn 1987, 55.

Description: This tumulus (diameter 16 m and height 300 mm) was one of a group of 12 tumuli, 10 of which were excavated by the Landesdenkmalamt in 1955. The iron wagon parts were found 1.5 m NNE of the assumed centre of the tumulus. 2 m to the SSE was an iron spearhead. Some sherds were also found in the tumulus. No traces of the burial were found.

Finds:

- 1) About 70 fragments of iron nave fittings. These consist of a conical nave-cap with one rib, a simple nave-head ring and an iron band. The iron band was presumably originally cylindrical, coming from the nave-neck; it was decorated with three ribs. The iron remains frequently carry traces of wood grain from the nave. (Pl. 41B)
- 2) Iron spearhead, 220 mm long. (Zürn 1987, pl. 57A, 1)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. 56/6c).

74A Kappel-Grafenhausen, tumulus 1 of 1880

(Ortenaukreis, Reg.-Bez. Freiburg)

References: Kimmig and Rest 1954.

Description: This grave was uncovered in 1880 by the activities of a brickworks. The remains of the grave were excavated by E. Wagner, who found that the tumulus was 74 m in diameter and 2.5 m high.

Just to the E of the centre, at a depth of 1.60 m, were remains of a layer of oak boards, orientated NW-SE. On the boards were fragments of weapons, bronze objects, an oinochoe, a bronze sheet belt, 'wheel nails', a pig's jaw-bone and human bones. To the S and SE were the gold objects. When the excavation was continued further to the N more of the wooden layer was found, on which lay iron tyres and wagon remains. Some of the wood close to the tyres showed a thin covering of bronze sheet. Further to the E, another wooden layer was found, but 800 mm higher than the other two discovered.

Finds:

- 1) 60 fragments of iron tyres of type VIIG, 38 mm wide. One tyre nail preserved horizontal wood grain. The nail heads were countersunk. (Pl. 41C, 4,5)
- 2) Fragments of iron nave fittings with inlaid bronze decoration (a variant of the Cannstatt nave type). The various parts of the fittings (nave-cap and nave-head sheathings) were held together by bronze solder, which is clearly to be seen on the inner surfaces of the iron fragments. The nave-cap has an external diameter of 145 mm and an axle-channel 61 mm in diameter. The outer edge of the nave-cap carries linear inlaid bronze decoration. The back of the nave-cap bears complicated wood structure, with the outer part of the cap preserving traces of wood grain perpendicular to the plane of the nave-cap, and then a join followed by traces of curved (circular) grain in the same plane as the nave-cap (Pl. 41C, 1). Two further iron nave fittings come from the rear of the nave-head. They bear parallel applied iron bands decorated with ladder-shaped inlaid bronze motifs (Pl. 41C, 3 preserves two such applied bands; Pl. 41C, 2 only has one band). Between the applied bands are inlaid bronze ladders which run at right-angles and diagonal to the applied bands (Pl. 41C, 2-3). (Pl. 41C, 1-3)
- 3) Six hollow-cast bronze sockets with profiled cross-section. Domed bronze sheet caps are fitted over the ends of the sockets. Preserved lengths 35-45 mm. (Kimmig and Rest 1954, 181, fig. 1, 12-17)

- 4) Oak wood remains, including spokes. Lost.
- 5) Two cast bronze rings with round cross-section (diameter 72 mm), each with four loops. (ibid. 183, fig. 2, 1, 2)
- 6) Six cast bronze rings provided with loops, with round cross-section, diameter 38 mm. (ibid. 183, fig. 2, 1 and 181, fig. 1, 3, 4)
- 7) Bronze square-shaped object, with round cross-section, measuring 24 × 24 mm. (ibid. 181, fig. 1, 7)
- 8) Cast bronze oval-shaped object with loop, surviving length 66 mm. (ibid. 181, fig. 1, 5)
- 9) Remains of bronze sheet phalerae, like those from Ludwigsburg, 'Römerhügel' (the Ludwigsburg examples are illustrated on Zürn 1987, pls 151, 1-4; 152)
- 10) Gold neck-ring, diameter 230 mm. (Kimmig and Rest 1954, 199, fig. 5, 2 and pl. 11)
- 11) Gold arm-ring. (ibid. 197, fig. 4, 2 and pl. 10, 1)
- 12) Fragment of a 110 mm long and 36 mm wide band of gold sheet, possibly an arm-band. (ibid. 199, fig. 5, 1 and pl. 10, 5)
- 13) Conical bronze button with gold cover, with embossed decoration. Diameter 36 mm. (ibid. pl. 10, 3)
- 14) Two conical gold sheet buttons. (ibid. pl. 10, 2, 4)
- 15) Three fragments of a bronze dagger with bronze sheet scabbard, surviving length 270 mm. (ibid. 183, fig. 2, 4, 6)
- 16) Several fragments of an iron knife with bronze sheet scabbard, surviving length 245 mm. (ibid. 183, fig. 2, 5)
- 17) Numerous fragments of an embossed bronze belt sheet. (ibid. 189, fig. 3)
- 18) Remains of nine thin, finely ribbed bronze strips, length 70 mm, width 6 mm. Each has a pair of rivet holes at both ends. Possibly from the rear part of the belt. (ibid. 183, fig. 2, 3)
- 19) Fragments of a bronze oinochoe. (ibid. 181, fig. 1, 1 and pl. 12, 1)
- 20) Fragments of a large bronze cauldron with 'T'-shaped thickened rim. (ibid. 181, fig. 1, 2)
- 21) Hollow bronze ribbed (?) pin-head, and fragment of a second, diameter 31 mm. (ibid. 181, fig. 1, 11)

Museum: Badisches Landesmuseum, Karlsruhe (wagon parts: inv. no. C. 3463).

74B Kappel-Grafenhausen, tumulus 3 of 1976 (Ortenaukreis, Reg.-Bez. Freiburg)

References: Beyer and Dehn 1977, 273-7; Dehn 1979, 3-6; Bittel et al. 1981, 408-10.

Description: Tumulus 3 was situated ca. 500 m W of tumulus 1, and was excavated because of serious plough damage to the central grave. Excavations in 1976 concentrated on the central grave and showed that the tumulus was originally 36 m in diameter, with a surviving height of only 520 mm. The central grave was in a rectangular wooden chamber placed on the old ground surface, orientated W-E. In the NE part of the chamber was the inhumation, associated with a plain bronze neck-ring, some fragments of bronze fibulae (including an arched fibula ('*Bogenfibula*'), a dagger with bronze wire-wound scabbard (Sievers' type Hallstatt?), two iron spearheads, and two large iron knives (*Hiebmesser*) with bone handles decorated with engraved dots-and-circles. The SW part of the chamber was occupied by the wagon, to the W of which were some pottery vessels with engraved decoration but no *Kerbschnitt*. The NW part of the chamber housed 14 bronze vessels, including a bowl

with decorated rim ('*Breitrandschale*'), eight ribbed buckets with movable handles, a large situla with an iron ring strengthening the rim, a large cauldron with a thickened, 'T'-shaped rim and a little jug-shaped vessel with bull's head handle ('*Kännchen mit Rinderkopfschenkel*'). Under this deposit of vessels were four bronze socketed protomes: two with animal heads, one with a spherical end and one with a perforated end. These sockets were provided with bronze chains, and may have decorated an iron tripod.

Comments: Restoration of these finds is not yet finished and detailed information concerning the grave must await the full publication.

Wagon finds:

- 1) Iron nave fittings with inlaid bronze decoration (type Winterlingen). The nave fittings include a nave-stock ring 157 mm in diameter with 'D'-shaped cross-section and diagonal inlaid bronze lines (Pl. 42, 4), and remains of four iron nave-caps, three decorated with inlaid bronze crosses, diameter 107-113 mm (Pl. 42, 2-3), and one decorated with a single inlaid bronze line, diameter 98 mm (Pl. 42, 1). The axle-channels measure 44-47 mm in diameter. The nave should doubtless be reconstructed with an iron nave-head ring and a conical bronze sheet nave-neck. (Pl. 42, 1-4)
- 2) Remains of at least three iron axle-caps of type Wijchen. The axle-caps are conical in profile, and bear inlaid bronze concentric circles on the flanges and in the centre. The external diameter of the flange is ca. 125 mm. One of the fragments includes remains of a linchpin which was probably trident-shaped. (Pl. 42, 5-6)

Present location: Landesdenkmalamt Baden-Württemberg, Freiburg i. Br.

75 Kirchberg an der Jagst - Lendsiedel, 'Fuchspörzel' (Kreis Schwäbisch Hall, Reg.-Bez. Stuttgart)

References: Hammer 1837, 421-426; Pauly 1838, 221-251; Lindenschmit 1860, 138; Hölder 1866, 77-78; Keller 1871, 51.57-59; Steiner 1900, 26-28; Paret 1935a, 25; Zürn 1965, 35; ibid. 1987, 171.

Description: The largest tumulus of a group of 32 tumuli in the Streitwald, the 'Fuchspörzel' was excavated by Hammer in 1839; it measured 138-150' (39.5-43 m) in diameter, with a height of 8' (2.3 m). A central inhumation burial, head orientated to the S, was covered by a stone core measuring 20-25' (5.7-7 m) in diameter and 2.28 m high; it lay 3' (0.86 m) above the base of the stone core. In the stone core were isolated thin metal fragments. The inhumation was supposedly provided with a sword and had numerous bronze and iron fragments to the E side, weighing 10-12 pounds. The tumulus contained the bones of at least six further burials, as well as sherds and bronze objects.

Lindenschmit (1860, 138) mentioned 'two round discs which are obviously nave-caps, and tyres 1½" wide' (ca. 42 mm wide).

Finds:

- 1) Iron objects weighing 10-12 pounds, including: two round iron nave-caps (lost); tyre fragments, ca. 42 mm wide (lost); 'sword' (lost).

Present location: The finds were never given to a museum and have presumably been lost.

76 Klettgau – Geißlingen, tumulus H

(Kreis Waldshut, Reg.-Bez. Freiburg)

References: Bittel et al. 1981, 410-411.

Description: Excavations in this cemetery of six tumuli began in 1969; graves were uncovered in the spaces between the tumuli. In 1972, tumulus H was excavated, measuring 25 m in diameter and 0.7 m in height. The central grave was in a large wooden chamber; it had been disturbed (Fig. 171). Sixteen pottery vessels, horse-gear and wagon parts remained. No traces of the burial were found.

Find:

- 1) Remains of at least two iron nave sheathings of type Breitenbronn. Each nave sheathing is made from two pieces of iron sheet: a profiled nave-head and a cylindrical nave-neck. Four nails held together the iron sheet of the nave-neck (nos 1, 4, 8, 11 and 13 on Fig. 171). (Pl. 43A, 3)
- 2) Numerous fragments of iron tyres, 24 mm wide, with a domed cross-section (type IVG) and nails set every 145-185 mm. The nails are bent over at the end, and show a penetration of 68 mm. The tyres have a diameter of ca. 820 mm. (Pl. 43A, 1)
- 3) Fragment of iron sheet with three nails; possibly a felloe-clamp (no. 3 on Fig. 171). (Pl. 43A, 2)
- 4) Iron horse-gear, including iron rings and a fragmentary iron bit. (nos 5, 6, 9 and 10 on Fig. 171)
- 5) About 16 pottery vessels.

Present location: Landesdenkmalamt Baden-Württemberg, Freiburg i. Br.

77 Köngen

(Kreis Esslingen, Reg.-Bez. Stuttgart)

References: Unpublished excavation report dated 1972 in the Landesdenkmalamt Baden-Württemberg, Stuttgart, by D. Planck ('Hallstatt-Wagengrab aus Köngen a. N., Lkr. Esslingen. Fundbericht').

Description: This wagon-grave was very badly damaged by drainage work, and was eventually discovered by children in 1972. The finds, including rich horse trappings, bronze vessels and a simple bronze bracelet and neck-ring, were found only 200 mm below the present-day ground surface. The excavations of the Landesdenkmalamt, Stuttgart, found grave goods scattered over an area 7 m in diameter. It seems probable that these finds originally belonged to a rich chamber grave covered by a tumulus, although no traces of grave structures survived.

A segment of iron tyre, 790 mm in length, was the one *in situ* find of the grave (Fig. 56). A 560 mm long piece of this tyre, associated with bronze and iron felloe-clamps, was encased *en bloc* in plaster and excavated under laboratory conditions. A large number of other wheel fittings were found in disturbed contexts (iron tyre fragments, iron and bronze felloe-clamps, bronze sheet nave-head rings, narrow nailed bronze strips). The tyres showed a curvature of 1.036-1.088 m in diameter, and were about 22 mm wide with a domed, almost semi-circular cross-section, with slight lips ca. 2 mm high on each side of the inner surface (type IIIG). The tyres were fitted with long nails with small countersunk heads, spaced 85-120 mm apart.

The segment of tyre encased in plaster was provided with five long iron nails and was associated with two felloe-clamps (an iron 'dumb-bell'-shaped clamp and a bronze 'U'-shaped clamp). The length of the iron tyre nails and the position of the 'U'-shaped felloe-clamps show that the wooden felloe was

118-123 mm thick, and traces of wood grain showed a Großebstadt felloe construction had been used. One of the tyre nails had diagonal wood grain on its upper part, and towards the tip of the nail the direction of the wood grain changed and ran parallel to the curvature of the tyre. The 'dumb-bell'-shaped felloe-clamp, made from two flat 'dumb-bell'-shaped plates fastened together by a pair of rivets, preserves wood grain showing a join between two felloe planks. The remnants of wood grain show that the composite outer felloe had a thickness of about 60 mm, and the inner spanned felloe was about 62 mm thick.

On examination of the internal side of this tyre segment, Professor G. Kossack was able to detect two impressions of spoke tenons 298 mm apart (measuring 10 x 34 mm and 11 x 36 mm). With an estimated tyre diameter of 1.062 m, it can be calculated that the wheels had 10 spokes.

It was not possible to calculate the number of segments in the outer part of the composite felloe. A large number of fragmentary iron 'dumb-bell'-shaped felloe-clamps with traces of joins between felloe segments was found, but the angles formed by the wood grain at the joins was by no means uniform (ca. 70°, ca. 70°, 70°, ca. 100°, 102°, ca. 110°, 112°, 119°, 120°, 155°). This variability can only be explained if planks of irregular lengths were used in the formation of the external felloe.

Six fragments of bronze nave-head rings survive from the naves. These measure 152-164 mm in external diameter, with an angular cross-section, one side being bent to a right-angle, the other side bent to a less acute angle. Some nailed bronze strips could also belong to the nave.

The wagon-box was decorated with bronze ornaments of type ii. These include openwork bronze plaques, various nailed rings with openwork spoked decoration and nailed bronze bands (see Ch. 7.2).

Comments: The grave finds from Köngen await publication by Professor G. Kossack. The author is grateful for permission to study his drawings, from which the reconstruction on Fig. 56 has been derived.

Museum: Württembergisches Landesmuseum, Stuttgart.

78 Ludwigsburg, 'Römerhügel', chamber grave 1

(Kreis Ludwigsburg, Reg.-Bez. Stuttgart)

References: Anon 1877; Fraas 1877, 47-48; Paulus 1877b, 130; Paulus 1878, 38-9; Lindenschmit 1881, Heft 10, pl. 1, 1-2; Fraas 1883, 335-337; Hölder 1883, 338; Paret 1921, 68-70.180; Goessler 1928, 39-41; Goessler 1930a, 52; Paret 1934, 61-64; Paret 1935a, 19-20; Paret 1942, 77-78; Schick 1956a, 78-87; Dehn 1951, 32-34; Zürn 1987, 98.

Description: In 1877, destruction of the tumulus (original diameter 60-80 m, original height 6 m) was begun, to make place for a water tower; the archaeological discoveries were closely observed by O. Fraas. At a depth of 5.5 m the stone core was uncovered, comprising a mass of 'eight to ten wagon loads' of stones. Under the stone core, resting directly on the natural soil, was a square chamber with sides 3.5 m long (Fig. 172). On the W side of the chamber lay an inhumation orientated with its head to the S. Associated with the inhumation was a gold neck-ring (Zürn 1987, pl. 148, 1), an iron dagger (ibid. pl. 149, 1), a small whetstone, and apparently fragments of a glass bottle. However, Dehn (1951, 32-34) suggested that the bottle cannot belong to the grave goods, as this type is otherwise not known before the 1st century BC. Some fragments of narrow ribbed

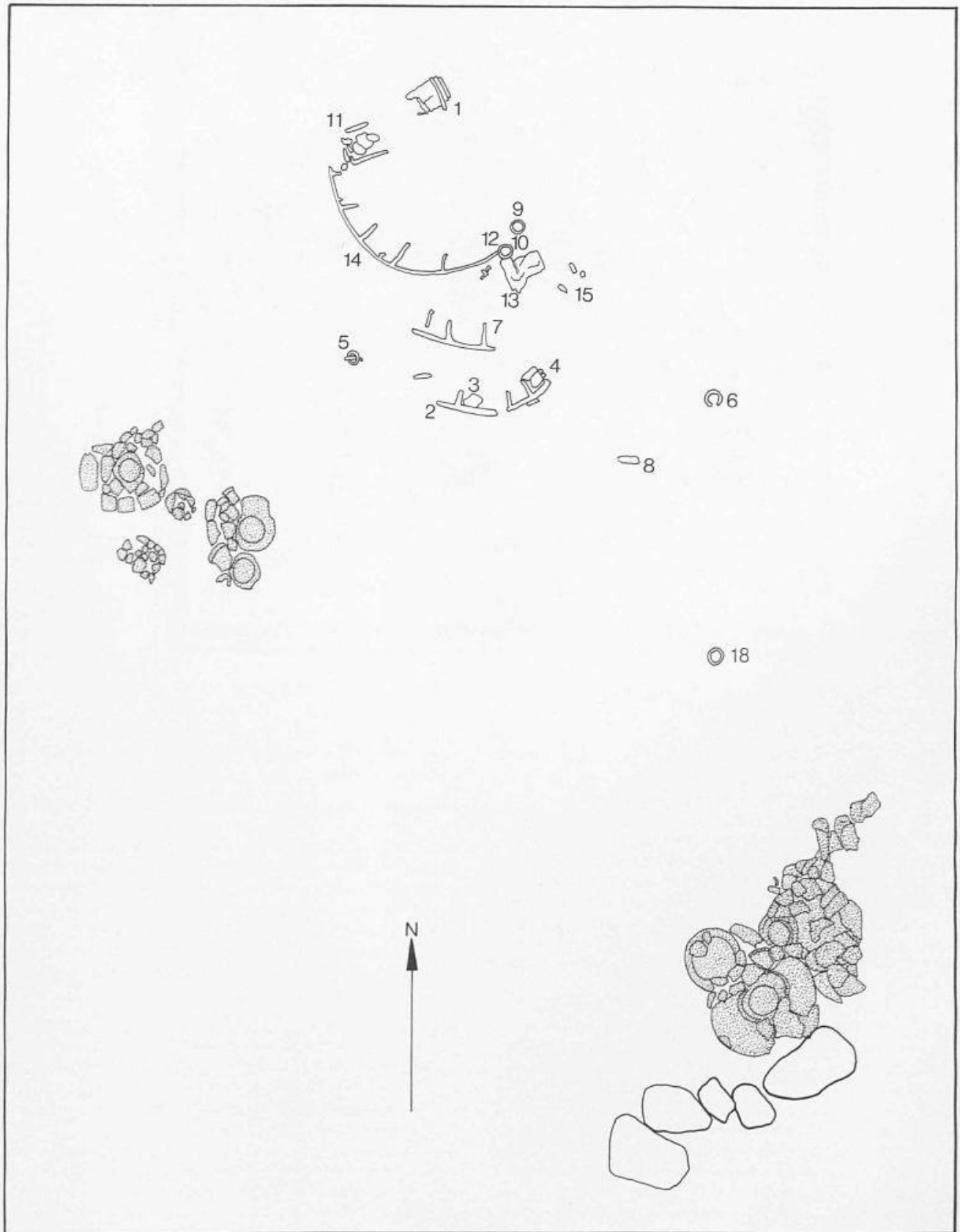


Fig. 171 Klettgau-Geißlingen, tumulus H: plan of the central grave (after an original kindly supplied by R. Dehn). — Scale 1:20.

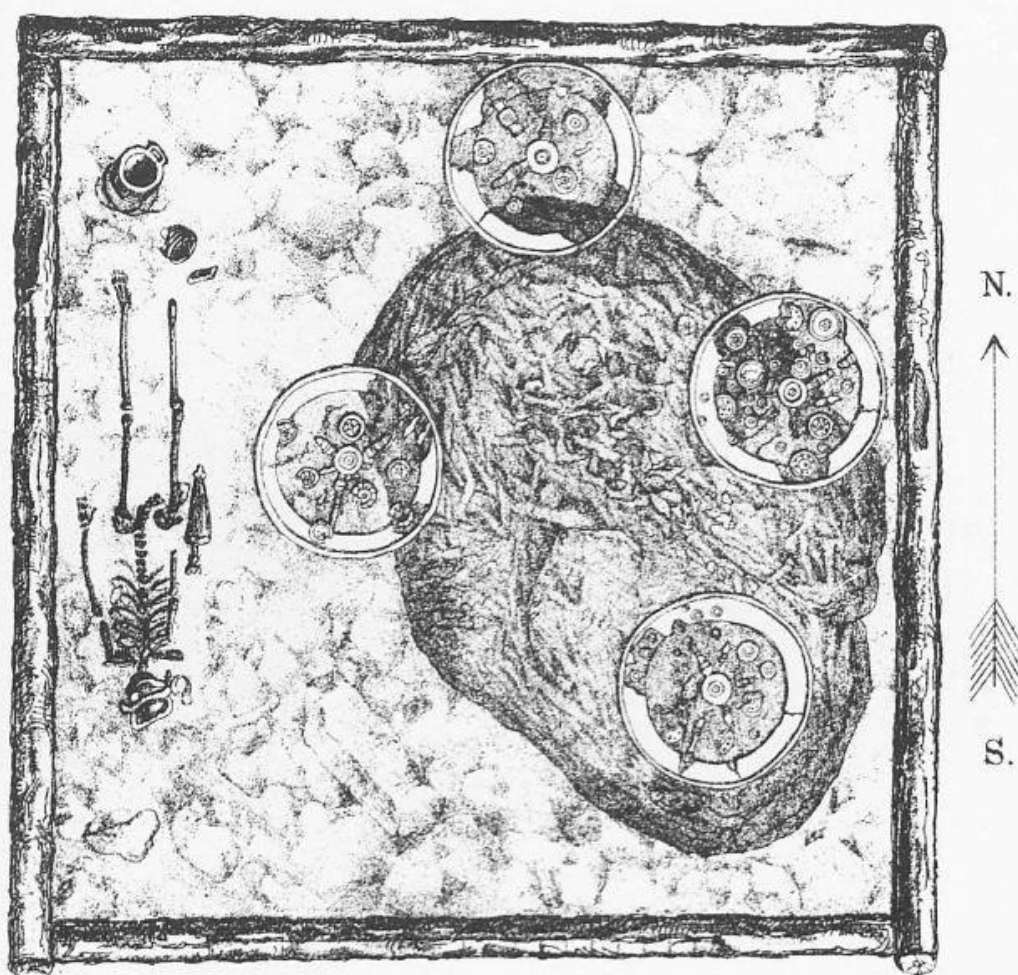


Fig. 172 Ludwigsburg, 'Römerhügel', chamber grave 1: grave plan (after Fraas 1883). — Scale 1:30.

bronze tubes and four hollow bronze rings may also belong among the personal grave goods (Zürn 1987, pls 148, 3; 149, 2–5). The burial was also provided with four bronze vessels: a cauldron, a handled basin of type Hatten, a ribbed bucket (*Rippenziste*) and a plate with point-boss decoration on the rim (ibid. pls 150; 151, 6). The grave goods also include a strip of gold sheet which probably comes from the mouth of a drinking horn (ibid. pl. 148, 2). Two fragments of an elaborate bronze chain may also have belonged to a bronze vessel (ibid. pl. 149, 8–9; similar chains come from Etruscan pyxides, see also Lorzendorf and Stanomin: Ebert 1926, pl. 208, a,b; ibid. 1928, pl. 91B, f).

The E side of the grave was occupied by a four-wheeled wagon and horse-gear. The horse-gear included an iron bit, four cast bronze cheek-piece terminals, 13 phalerae with concentric ribs and rings of bosses (diameters 51, 125–130 and 156 mm), a bronze toggle and a bronze double ring (Zürn 1987, pls 148, 14–7; 149, 6–7; 151, 1–5; 152). From the yoke came a bronze yoke pendant made from a large bronze ring with four loops, from which four chains of double rings are suspended, a cast bronze horse, four cast bronze birds and two bronze knife-shaped pendants (ibid. pls 148, 4–8.18–9; 153).

Concerning the four-wheeled wagon, satisfactory information is only available for the naves, spokes and axle-caps. Otherwise, the only surviving wagon finds are three fragments of iron sheet and an iron tubular collar. The body of the wagon was covered with iron fittings, and these, as well as the tyres, have been lost.

Paret (1921, 69) states that the undercarriage and axles of the wagon were made of birch and pear wood.

Comments: A second wooden chamber was found 3 m N of the first. Only one side of this grave could be completely uncovered, measuring 4 m in length. The chamber was sunk 1.2 m into the natural soil. Remains of a dagger, gold sheet, amber plaques etc. were found. Later excavations, in 1926 and 1927, discovered 14 or more secondary graves in the S part of the tumulus. It is not certain whether chamber grave 1 was a primary or secondary grave. However, the greater size of the second chamber, and the fact that it was sunk into the natural soil, would suggest that it was the primary grave of this tumulus.

Wagon finds:

- 1) Remains of ribbed bronze nave fittings of type Cannstatt. Some of these remains were damaged by fire during the Second World War. However, the best-preserved fittings were reconstructed on a wooden base, along with an iron axle-cap, and these remained undamaged. The fittings were made in two parts, comprising a cylindrical section for the nave-head and a section for the neck and the stock of the nave. The full length of the nave measures 410 mm, and the diameter of the head measures 120, the neck 100, and the stock 140 mm. The cover for the stock of the nave also carries slots for the eight spokes, measuring 22 × 36 mm. Circular shadows of the bases of the wooden spokes have also survived and show a diameter of 52 mm. (Pl. 45, 11)

- 2) Wooden spokes, with remains of ribbed bronze covers. The wood of these spokes has shrunk considerably, but in most cases preserved a circular or slightly oval cross-section. The spokes were probably completely covered by bronze sheaths, which bear the same sort of ribbing as the nave itself. (Pl. 45, 6–8)
- 3) Remains of four axle-caps of type Wellenburg, finely profiled. The internal diameter of the conical 'neck' part of the axle-caps ranges from 51 to 56 mm. The diameter of the flange of the axle-caps is the same as the diameter of the nave-head (120 mm). (Pl. 45, 1.2.11)
- 4) Two iron linchpins with small semicircular profiled heads. The position of the linchpins, which fitted through holes in the axle-caps, is shown on Pl. 45, 11. (Pl. 45, 3.11)
- 5) Four iron rings, with internal diameters of 55–60 mm. According to the ring shown on Pl. 45, 4, the external diameter of the ring was at least 116 mm. In each case the rings consist of a flat external flange and a thickened internal rim, whereby the thickened internal rim may be rectangular or triangular in profile. (Pl. 45, 4.5.9.10)
- 6) Remains of an iron 'omega-clip'. One end terminates in the remains of a ring, the other end is forked. Preserved length 39 mm. (Pl. 45, 12)
- 7) Cylindrical iron collar, external diameter 41 mm, height 20 mm. (Pl. 45, 13).

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. A. 8722).

79 Meßkirch – Langenhart, 'Haggenberg'

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Lindenschmit 1860, 113.203–204; Zingeler 1894, 48; Wagner 1908, 44 (= 'Engelswies'); Paret 1935a, 24; Zürn 1987, 159 ('Trocheltfingen').

Description: This tumulus was 60' (17.2 m) in diameter and had a height of 12' (3.4 m). Inside the tumulus was a stone core, built over a burnt layer. The finds were spread through the whole tumulus.

Ten feet (2.9 m) deep, a piece of wood 3' (0.86 m) long and 2' (0.57 m) wide was found; its upper surface was covered with bronze ornaments. The lower surface was covered with leather (Pl. 44A, 1.3–12). Among the decorative bronze knobs and ornaments were rhomboidal 'frames' with an openwork cross in the middle; each of the 'frames' was cast with four nails (Pl. 44A, 5). Lindenschmit thought that this wooden object was a shield, and suggested that it must have been 1" (28.6 mm) thick, judging from some iron nails (Lindenschmit 1860, pl. 9, 8.9). The excavators also found a second, narrower wooden board with one tapering end, decorated in a similar way with bronze ornaments (Pl. 44A, 2). Among the finds was an iron fragment and an iron ring (ibid. 1860, pl. 9, 14.15). Lindenschmit also reported a fragmentary bronze fibula and a number of iron wagon remains. In the Sigmaringen museum, only the fibula and the wagon remains survive (see below).

Comments: It is sadly impossible to judge with certainty whether the above finds all came from the same grave. Nevertheless, it seems most likely that at least two graves are involved: a primary (cat. no. 79A; Pl. 44A) and a secondary wagon-grave (cat. no. 79B; Pl. 43B).

Finds:

- 1) Three fragments of iron fittings, from the head of a nave of Cannstatt type. The external diameter measures ca. 150

mm, and the internal diameter (i.e. the diameter of the nave-neck) ca. 110 mm. On the outer surface of the iron sheet are three applied decorative iron bands. (Pl. 43B, 1)

- 2) Curved iron band, 17 mm wide. (Pl. 43B, 3)
- 3) Two fragmentary iron half-cylinders, each with a thickened end. Original length ca. 52 mm, width ca. 27 mm. In the inside of the cylinder, vertical wood grain survives, and this continues to cover the edge, showing that these objects were truly half-cylinders and not full iron tubes. (Pl. 43B, 4–5)
- 4) Fragment of a bronze serpentine fibula with profiled, eight-pointed cross-section. Mansfeld believes that the fibula was of his S4 construction (Mansfeld 1973, 166, Fundliste 32: 'Engelswies-Hackenberg'). (Pl. 43B, 2)

Museum: Fürstlich Hohenzollernsches Museum, Sigmaringen (inv. nos 153, 154, 428 and 1415).

80 Meßkirch – Ringgenbach

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Lindenschmit 1860, 136.203; Zingeler 1894, 46; Paret 1935a, 24; Zürn 1987, 182–3.

Description: A fragment of an iron tyre was found in one of the seven tumuli near Ringgenbach. It is not clear which, if any, of the objects mentioned by Lindenschmit (1860, 203) were associated with the tyre fragment. However, the Sigmaringen inventory notes some fragments of a bronze chain, which could possibly belong to the same grave.

Finds:

- 1) Four fragments of an iron tyre of type IV, ca. 25 mm wide. (Pl. 44B, 1–2; Zürn 1987, pl. 369, 4)
- 2) Eight fragments of bronze chain. The links are each made from three rings cast together. Ring diameter ca. 14 mm. (Pl. 44B, 3–4)

Museum: Fürstlich Hohenzollernsches Museum, Sigmaringen (inv. nos 25, 30 and 39).

81 Meßstetten – Hossingen, tumulus 1 of 1867

(Zollernalbkreis, Reg.-Bez. Tübingen)

References: Oetinger 1869, 38–52; Zürn 1987, 224.

Description: This was the largest tumulus in a group of six tumuli, and it was excavated by Pfarrer Oetinger in 1867. Oetinger wrote that the height of the tumulus was 6' (1.72 m), with a diameter of 20' (5.73 m), but earlier the diameter was probably 60' (17.2 m) and the height 7–8' (2.06–2.3 m). The tumulus was plundered in about 1841. As Oetinger discovered, these excavations had disturbed the W part of the tumulus, up to a point $\frac{1}{2}$ ' (143 mm) W of the central grave.

Roughly in the centre and at the base of the tumulus, Oetinger found two parallel wooden boards (ca. 1.15 m long and ca. 86–115 mm wide) set ca. 430 mm apart. The boards were decorated with bronze knobs and nailed rings ('dicht mit kleinen Bronzeknöpfen und mehreren größeren Ringlein, die gleichfalls zwei Stifte hatten, beschlagen'). Between the boards, at the N end, Oetinger found 10 bronze openwork plaques. From Oetinger's description, it seems that they were threaded onto two bronze wires, in two sets of five. The wires bearing the plaques were fastened to a wooden board 200 mm wide by staple-like bronze wires which had been bent into a loop.

To the S of, or at the S end of this wooden construction, the excavators found three bronze rings and a large number of tiny bronze sheet knobs. Further to the S, Oetinger discovered an

inhumation burial orientated roughly (head)S-N(feet), provided with an iron sword, three bronze pins, and 'eine zertrümmerte Schließe mit einem flachen Ringlein zum Schieben von Bronze' (probably toilet implements).

It is unclear whether the inhumation belongs to the wooden construction; however, according to Oetinger's description, both were at the base of the tumulus, and the inhumation could not have been more than 1½–2' (430–570 mm) away from the wooden construction. The wooden construction, at least, could have been housed in a wooden grave chamber, to judge from the 'black layer' found 5" (143 mm) beneath it.

Finds:

- 1) Two bronze rings with square cross-section, diameter 38 mm. (Pl. 46A, 11.13)
- 2) One bronze ring with square cross-section, diameter 30 mm. (Pl. 46A, 12)
- 3) A very large number of small bronze decorative knobs. (Zürn 1987, pl. 491C, 11)
- 4) A number of rings, each with a pair of nails, diameter 13 mm. Ten survive, although the inventory book originally listed 14. (Pl. 46A, 6)
- 5) 10 bronze openwork plaques, measuring 70 × 84 mm. (Pl. 46A, 3–5.7–10.14–16)
- 6) Bronze wire, length 770 mm, width ca. 2.5 mm, broken into four parts which have recently been soldered together. One end of the wire is bent into a hook. (Pl. 46A, 1)
- 7) Eight bronze staple-like wires which have been bent into a loop; the ends of the wires are pointed. Length 30–35 mm. (Pl. 46A, 2)
- 8) Three bronze pins. One lost. (Zürn 1987, pl. 491B, 1–2)
- 9) 'Eine zertrümmerte Schließe mit einem flachen Ringlein zum Schieben von Bronze'. Lost.
- 10) Iron sword, length ca. 1 m. (ibid. pl. 491B, 3)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. A.3302).

82 Neuhausen ob Eck, 'Hexenwiesen'

(Kreis Tuttlingen, Reg.-Bez. Freiburg)

References: Hölder 1895, 58; Reim 1978; Zürn 1987, 206.

Description: This 'very large and high' tumulus was excavated in 1892 by Eulenstein; it belonged to a group of 21 tumuli in the 'Hexenwiesen'. The excavators found an inhumation with two bronze fibulae and two iron spearheads. On each wrist was a bronze bracelet. Also associated with the skeleton were nine small bronze rings and a fragment of a bronze chain, the links of which are made from three or four bronze rings cast together. The grave contained two iron nails. Hölder states that the grave contained an iron dagger in an iron scabbard, but this is not mentioned in the inventory of the Museum für Vor- und Frühgeschichte (West Berlin). According to the inventory book, a profiled amber bead, a whetstone, a small bronze hook and some perforated bronze fragments were also associated with this grave.

Comments: Many of these finds have been lost, but copies of sketches in the inventory book of the Museum für Vor- und Frühgeschichte are published here, and allow some understanding of this grave. The finds from this tumulus have recently been published by H. Zürn (1987, pl. 436).

Finds:

- 1) Two iron tyre nails with large rectangular heads (?type VC). The longer nail measures 75 mm with a penetration of

66 mm (head 42 mm long), the shorter nail, which was evidently hammered in crooked and then replaced with another nail, measures 55 mm (head 22 mm long). Lost. (Pl. 44C, 6–7)

- 2) Amber bead, 19 mm in diameter. Lost. (Pl. 44C, 2)
- 3) A bronze chain with links which are each made from three or four rings cast together; each ring is ca. 14 mm in diameter. Lost. (Pl. 44C, 1)
- 4) Two bronze drum fibulae (*Paukenfibeln*). The spring has an iron axle. Length 31 mm. Lost. (Pl. 44C, 3)
- 5) Whetstone in two fragments, surviving length 138 mm. Lost. (Pl. 44C, 10)
- 6) Nine bronze rings, 12–19 mm in diameter. Two of the rings have square-shaped cross-sections, the rest are round in cross-section.
- 7) Small rectangular bronze fitting with three rivet holes. Length 16 mm. Lost. (Pl. 44C, 4)
- 8) Solid bronze undecorated arm-ring, round in cross-section, diameter 92 mm, and a fragment of a second arm-ring. (Pl. 44C, 9)
- 9) Small bronze ringed hook, length 24 mm. (Pl. 44C, 11)
- 10) Iron socketed spearhead, length 98 mm. (Pl. 44C, 8)
- 11) Iron spearhead, socket not preserved. Length 191 mm. (Pl. 44C, 5)
- 12) Iron dagger in an iron scabbard (according to Hölder 1895, 58). Lost.

Museum: Museum für Vor- und Frühgeschichte, Schloß Charlottenberg, West Berlin (inv. nos IIc 2894–2898, 2901, 2904, 2910, 2912, 2915 and 3085).

83 Reichenau, tumulus B

(Kreis Konstanz, Reg.-Bez. Freiburg)

References: Aufdermauer 1966.

Description: Tumulus B was 28 m in diameter and 3 m high. The chamber was placed on the natural gravel and although no trace of the wooden chamber had survived, the position of the grave goods showed that it was orientated NW-SE, measuring ca. 2.2 × 3 m (Fig. 173). The chamber was covered by a trapezoidal stone core orientated NW-SE, 9 m long and 3–5 m in width, with a surviving height of 1.30 m. The NE part of the chamber was disturbed by the digging of trenches by the military.

One shallow post-hole (150 mm in diameter) was found in the W half of the chamber. In the middle of the chamber were the remains of an extended human inhumation, orientated (head)SE-NW(feet). Near the head was a bronze pin surrounded by remnants of leather or felt. In the NE part of the chamber was a collection of horse-gear forming a layer ca. 100 mm deep and 1.0–1.2 m long. This was lifted *en bloc* in plaster by the excavators, but the plaster broke, rendering the exact position of the horse-gear in the grave impossible to reconstruct.

In the N corner of the chamber were two wheels ('3' and '4' on Fig. 173) which, before the collapse of the chamber, originally stood upright. On the plan, two felloe-clamps can be seen associated with the tyre of wheel '3'. The NE wheel ('2') had mostly been lost to the above-mentioned disturbance. In the S corner of the chamber was the fourth wheel ('1'). The chamber contained eight pottery vessels, five in the W corner ('1–4'), two on the left-hand side of the burial ('5' and '6'), and one by wheel '1' ('7'). Near the S wall of the chamber were the remnants of a pig.

Comments: In the museum of Konstanz, it was only possible to study a few nave and tyre fragments from this grave. The

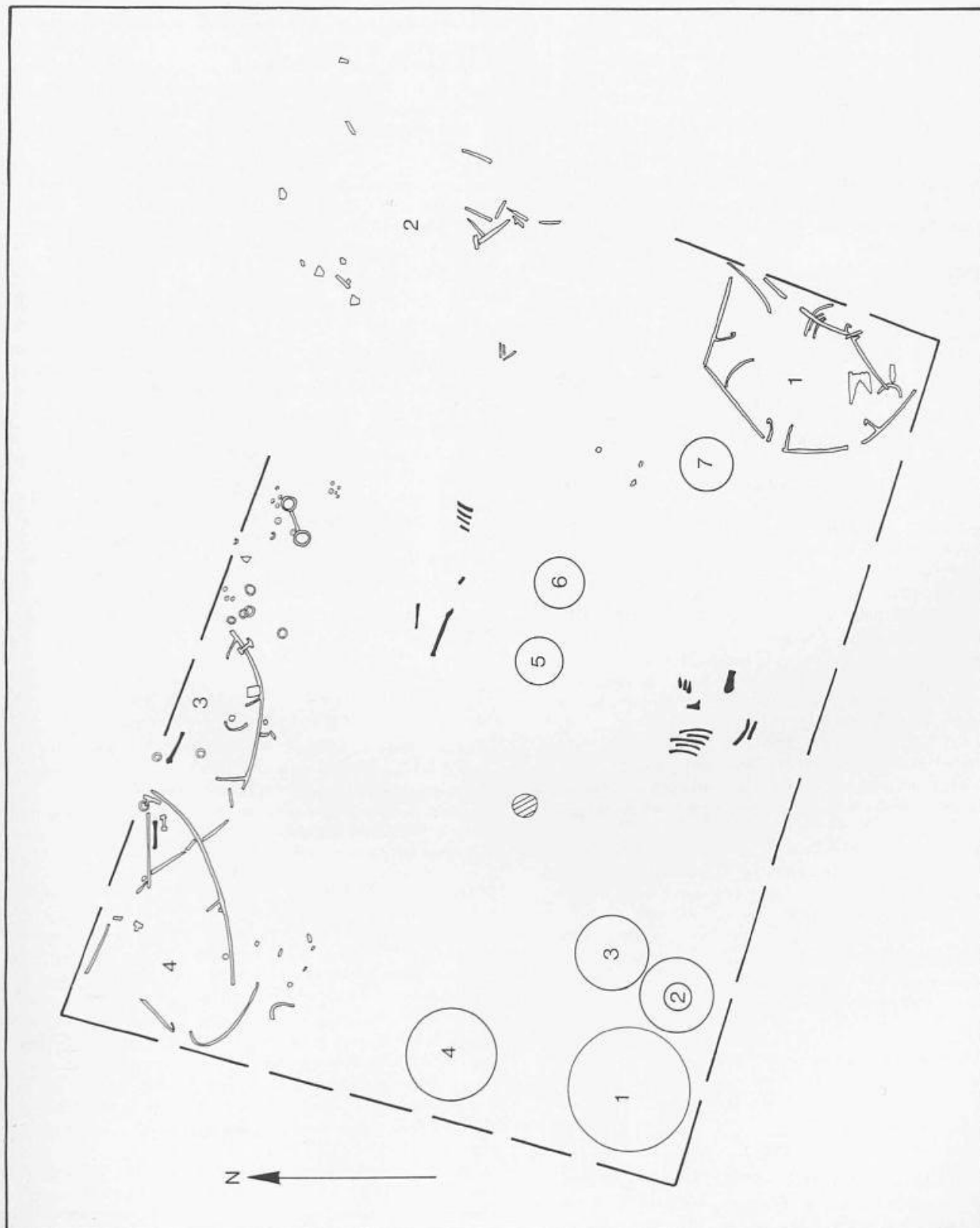


Fig. 173 Reichenau, tumulus B, plan of the grave chamber (after a plan in the Landesdenkmalamt Baden-Württemberg, Freiburg in Breisgau). — Scale 1:20.

location of the other wagon parts is not known, and they may be lost.

Finds:

- 1) Fragments of iron tyres with a reconstructed diameter of 890 mm and a cross-section of type IV, ca. 18 mm wide. The longest nail survives with a penetration of 96 mm. The nail heads are sometimes visible protruding slightly above the level of the tyre and are subrectangular in shape, measuring ca. 18 × 10 mm. Where nails are visible in the tyres, they are spaced at an interval of 133, 187, 205 and 230 mm. (Pl. 46B, 1-2)
- 2) Nave fittings, comprising simple iron hoops of two kinds:
 - (i) ca. 36 mm wide and ca. 130 mm in diameter (Pl. 46B, 3);
 - (ii) ca. 18 mm wide and ca. 160 mm in diameter. Each nave probably originally had a pair of each of these hoops.
- 3) About five fragmentary 'T'-shaped felloe-clamps were found, and on wheel '3' the plan shows a further felloe-clamp *in situ* which may have been 'U'-shaped.
- 4) Four bronze ring-footed rein-knobs.
- 5) 13 bronze rings, 40 mm in diameter, with square cross-section, 4-5 mm thick.
- 6) Three small bronze rings, 17-22 mm in diameter, with round cross-section, 2-3 mm thick.
- 7) About 50 small bronze knobs, each with a pair of clasps.
- 8) Two fragmentary iron horse bits, each with two large iron rings.
- 9) Fragmentary bronze pin, head lost. Surviving length 138 mm.
- 10) Vessel 1: bellied conical-necked vessel (*Kegelhalsgefäß*); rim and neck graphited; on the shoulder are standing graphited triangles; height 355 mm.
- 11) Vessel 2: bellied conical-necked vessel (*Kegelhalsgefäß*); rim graphited inside and outside; zig-zag graphite bands on the neck and body; height 206 mm.
- 12) In vessel 2: small graphited cup; height 48 mm.
- 13) Vessel 3: broad-shouldered collared vessel; engraved and stamped decoration on the shoulder, with painting of various colours; height 172 mm.
- 14) Vessel 4: bellied conical-necked vessel (*Kegelhalsgefäß*); rim graphited inside and outside; neck and shoulder carry vertical graphite bands on a red-painted background; the graphite bands are bordered by engraved lines; height 364 mm.
- 15) Vessels 5 and 6: two identical bowls with everted rims; outside of rim and internal rim-lip graphited; inside, on a red-painted background, zig-zag graphite bands; heights 90 and 94 mm, rim diameters 164 and 167 mm.
- 16) Vessel 7: small rimless bowl; upper part of the outside graphited, also the base and part of the outside near the base are graphited; height 76 mm.
- 17) Various undiagnostic iron fragments.
- 18) Pig bones.

Museum: Rosengartenmuseum, Konstanz.

84A Salem, tumulus G

(Bodenseckreis, Reg.-Bez. Tübingen)

References: Wagner 1892, 1; Wagner 1899, 59-61; Rest 1939. Unpublished manuscript by E. Wagner, dated 1879, in the Badisches Landesmuseum, Karlsruhe ('Verzeichnis der Alterthümer-Fundstätten im Großherzogtum Baden').

Description: A tumulus of 26 m in diameter and 3.40 m in height was excavated by Wagner in 1892. The tumulus contained a

large stone core roughly 6 m in diameter and the remains of a stone ring with an internal diameter of about 10 m. The W side of the stone core was destroyed, and only a few sherds and patches of charcoal were found under it. To the W of the stone core (about 1.3 m above the base of the tumulus and above the stone ring) were fairly numerous sherds, 'Eisennägel mit 3,5 cm breiten, wenig gewölbten Köpfen, zum Teil durch längliche Eisenstücke gesteckt, manche mit anhängenden Holzresten (offenbar Radreifen und Nabenstücke)', some small pieces of bronze sheet, a few bronze nails with hemispherical heads, and two very small burnt pieces of bone (Wagner 1899, 60).

Comments: It seems possible that these wagon remains and sherds may have come from the central burial. The W side of the stone core was obviously destroyed and as a result of the destruction, the finds from the central grave may have been disturbed and redeposited to the W, above the stone ring.

Finds:

- 1) Three tyre nails are preserved (type VC), with nail heads measuring ca. 35 × 13, ca. 33 × 14, and ca. 33 × 15 mm. (Pl. 47A, 2.3.5)
- 2) Fragment of an iron nave-stock ring. The cross-section is roughly semi-circular with a thickness of 13 mm. One nail survives. (Pl. 47A, 1)
- 3) Two small iron fragments.
- 4) Numerous sherds, some with coloured ornamentation. Lost. (Pl. 47A, 4)
- 5) A few fragments of bronze sheet and one fragment of a hemispherical rein-knob. Lost. (Pl. 47A, 7)
- 6) A few bronze nails with hemispherical domed heads. Lost. (Pl. 47A, 6)
- 7) Two small pieces of burnt bone. Lost.

Museum: Badisches Landesmuseum, Karlsruhe (inv. no. C.6280).

84B Salem, tumulus T

(Bodenseckreis, Reg.-Bez. Tübingen)

References: Wagner 1885, 4; Wagner 1899, 55-56 and 70-71; Rest 1939. Unpublished manuscript by Forstinspektor Bleibimhaus, dated 12. vi. 1834, in the Landesdenkmalamt, Tübingen ('Beyträge zur Beschreibung der in dem Walddistrikt Hardt bey Salem befindlichen altdeutschen Grabbügel und der darin aufgefundenen Gegenstände').

Description: According to Forstinspektor Bleibimhaus, the excavation of four tumuli was carried out in 1830. A shaft 8-10' (2.3-2.9 m) wide and reaching the base, was sunk into each of the four tumuli. Numerous sherds were found, also 'mehrere von Rost ganz durchdrungene gebrochene Stücke Eisen, welche bey verschiedener - 1 Fuß nicht übersteigender - Länge circa 7 Linien breit und 3 Linien dick sind, und an denen man noch die Stellen bemerkt, auf welchen sie mittelst Nägeln an einen länglich runden hölzernen Körper, von dem sich auch noch Spuren zeigen, befestigt waren' (unpublished manuscript by Bleibimhaus, page 2). Some vessels from the excavations of 1830 and 1834 survive, but these need not be associated with the tyre fragments (Wagner 1899, pl. 8, 1-6).

One of the four tumuli (tumulus T) was re-excavated by Wagner in 1891 (diameter 22 m, height 2 m). The tumulus had no stone core. It contained a quantity of sherds, from which two bowls and a small cup could be reconstructed. Further, small nailed iron fragments and iron rings etc. were found. It seems likely that Wagner's tumulus T was the one which produced tyre fragments in the excavations of 1830.

Finds:

- 1) Remains of iron tyres, width ca. 7 Linien (about 20 mm), thickness ca. 3 Linien (about 8.6 mm), maximum length 1' (286 mm). Lost.
- 2) Two flat bowls, diameter 310 and 320 mm, height 70 and 75 mm, with rims carrying double engraved zig-zag lines and traces of black and red painting. (Pl. 47B, 1-2)
- 3) Sherds from the upper part of a small grey cup, surviving height 40 mm. (Pl. 47B, 3)
- 4) Sherds of large grey vessels, some with linear decoration. Lost.

Museum: Badisches Landesmuseum, Karlsruhe.

85 Sankt Johann, tumulus of 1852

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Goessler 1909, 153, note 7; Zürn 1987, 153.

Description: Goessler noted that a tumulus was excavated in 1852, in a group of 10 tumuli below the Kirchlesberg, in the 'Holzwiesen' (also called 'Rauschgefild' or 'Krückenwiesen'). The excavators brought to light 'numerous iron fragments from a wagon, shields etc.'

Present location: The finds were given to Dr Schmidt of Metzingen and are now doubtless lost.

86 Sankt Johann, tumulus of 1884

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 15; Goessler 1909, 152; Paret 1935a, 24; Zürn 1987, 154-5.

Description: A tumulus on the 'Eulenwiese' was excavated in 1884 for von Föhr by two local men. The tumulus had a diameter of 19 m, and was 6' (1.73 m) high. The excavators found two inhumation graves, 3' (0.86 m) and 4' (1.15 m) deep respectively. At a depth of 6' (1.73 m), under a stone core measuring 12-15 square metres, lay a double inhumation burial with two iron spearheads, fine small bronze rings and remains of a bronze belt sheet. Not far away were large bones, apparently from a horse. The excavators found a large quantity of iron rust, and an iron rust layer on the natural ground surface. The iron rust layer was covered with 'such remarkable figures and imprints', that the excavators couldn't but have the impression that they constituted traces of an iron wagon along with the animals harnessed in front of it.

Comments: None of the iron 'wagon parts' have survived and it does not seem possible to associate them securely with any of the inhumation burials, which may have been secondary graves.

87 Sankt Johann, tumulus of 1897

(Kreis Reutlingen, Reg.-Bez. Tübingen)

References: Goessler 1909, 154; Zürn 1987, 154.

Description: A tumulus in the Flur 'Ried', on the road from Würtingen to St. Johann, was excavated by the Urach Verein in 1897. The tumulus contained a bronze cauldron with an iron handle, a bronze ring 180 mm in diameter, an iron dagger, a 'bent piece of iron' and an iron spearhead. According to H Zürn the finds also included a pair of serpentine fibulae (ibid. 1987, 154; pl. 291, 2-3).

Finds:

- 1) One tyre fragment of type VII, 220 mm long and 30 mm wide. The cross-section is flat with bent over edges. (Pl. 47C, 2)
- 2) Solid bronze neck-ring, undecorated. Diameter 180 mm, circular cross-section, diameter 7 mm. (Pl. 47C, 3)
- 3) Iron spearhead, 315 mm long. The blade of the spearhead has a central rib; the base of the socket is decorated with two ribs. Some remains of wood are still preserved in the socket. (Pl. 47C, 1)
- 4) A bronze cauldron with a fixed iron handle, rim diameter 350 mm. (Possibly Zürn 1987, pl. 291, 1)
- 5) Iron dagger. (Pl. 47C, 4)
- 6) Fragments of two bronze serpentine fibulae with long feet, one with a large bronze sheet terminal knob. (Zürn 1987, pl. 291, 2-3)
- 7) Seven bronze rivets. (ibid. pl. 291, 7)

Museum: Württembergisches Landesmuseum, Stuttgart.

88 Sigmaringen

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Paret 1935a, 24; Zürn 1987, 185.

Description: The finds came from a group of 13 tumuli 'im Ziegelholz', near Sigmaringen. Nothing is known about the excavations, but Paret argues that they probably took place after 1894. In Sigmaringen museum are numerous fragments of tyres and some bronze sheet fragments, probably from bronze nave-neck sheathing.

Finds:

- 1) 15 fragments of iron tyres of type VC, width 18-20 mm, with large-headed nails (35-42 mm long). (Pl. 50B, 1.3; Zürn 1987, pl. 380A, 1)
- 2) Three fragments of bronze sheet, one showing traces of a join, an iron nail head, and a nail hole. (Pl. 50B, 2)

Museum: Fürstlich Hohenzollernsches Museum, Sigmaringen (inv. nos 156 and 165).

89 Sigmaringen - Laiz

(Kreis Sigmaringen, Reg.-Bez. Tübingen)

References: Von Hövel 1832, 293-296; Lindenschmit 1860, 206-208; Zingeler 1894, 45; Paret 1935a, 24; Zürn 1987, 186-7.

Description: Lindenschmit describes the following relevant finds from Laiz:

- 1) The iron tyres published by Lindenschmit (1860, pl. 12, 10-11) come from one of the two groups of tumuli which were opened in the early 1830s. These were later identified by Paret in the museum of Sigmaringen; he listed three fragments of iron tyres. The finds have recently been published by H. Zürn. Cat. no. 89A.
- 2) Lindenschmit described finds from an excavation by von Mayenfisch, in a tumulus 120' (34.4 m) in diameter and 7' (2.06 m) high. It is not clear exactly where this tumulus was located, or when the excavations took place. The finds were already lost when Lindenschmit wrote and he referred to drawings (and a report ?) by von Mayenfisch, which is now lost. Lindenschmit wrote that two bronze spool-shaped objects were found on a large pottery bowl. The larger spool was fixed by a wooden dowel to a piece of oak, which was apparently covered with leather and ornamented with bronze rings and nails (Pl. 50C,

1–2). The smaller spool was fixed by a dowel between two layers of wood (Pl. 50C, 4–5). Alongside these finds lay a fragment of iron tyre (Pl. 50C, 8). Also found alongside the bowl were fragments of embossed bronze sheet, which were apparently fixed to leather and wood (Pl. 50C, 6–7). Cat. no. 89C.

Finds:

Cat. no. 89A

- 1) Iron tyre fragments, edges slightly bent down, width 24 mm. The tyres have a cross-section of type VII. (Lindenschmit 1860, pl. 12, 10–11; Zürn 1987, pl. 387, 11)

Cat. no. 89C

- 2) Fragment of iron tyre, relatively wide cross-section, with bent down edges. Length 3'3" (0.95 m). Lost. (Pl. 50C, 8)
- 3) Large bronze spool-shaped object mounted on a piece of oak, which was covered with leather and ornamented with bronze rings and nails. Lost. (Pl. 50C, 1–2)
- 4) Small bronze spool-shaped object, mounted between two pieces of wood. Lost. (Pl. 50C, 4–5)
- 5) Fragments of bronze sheet with embossed decoration. Originally mounted on leather and wood. Lost. (Pl. 50C, 6–7)
- 6) Large pottery plate with stepped profile, diameter 1'6" (459 mm). Painted and incised geometric decoration. Lost. (Pl. 50C, 3)

Museum: Cat. no. 89A: Fürstlich Hohenzollernsches Museum, Sigmaringen (inv. no. 78). The finds from von Mayenfisch's excavation (cat. no. 89C) were never given to a museum and were apparently lost by 1860.

90 Stuttgart – Bad Cannstatt, grave 1

(Kreis Stuttgart, Reg.-Bez. Stuttgart)

References: Paret 1935a, 1–38; Paret 1935b, 370–372; Paret 1935c, 265; Paret 1942, 79; Schiek 1956a, 11–18; Zürn 1987, 189.

Description: A rich grave was discovered during building work in 1934, and was excavated by O. Paret in the same year (Fig. 174). The covering tumulus had been completely destroyed. The outlines of the wooden chamber were also not visible to the excavator – wooden traces were only preserved under the bronze grave goods. The inhumation burial had not survived, but its position and orientation, (head)S–N(feet), are shown by the grave goods (gold neck-ring, gold arm-band, bronze arm-ring, bronze belt-sheet, three small rings, two of gold and one of bronze). To the W of the burial were three fibulae and an iron spearhead. Two further iron spearheads were found to the E of the burial. At the E side of the grave stood a four-wheeled wagon, two bronze cauldrons, a small gold bowl and horse-gear. The S end of the wagon was destroyed by building activity and the metal vessels and horse-gear were removed by the building workers, so that their exact original position is unknown. However, following information supplied by the workers, Paret was able to reconstruct the plan of the SE corner of the grave (Fig. 174). Paret, judging from the position of the grave goods, estimated a chamber size of 3 × 3.5 m. Of the grave goods the bronze belt-sheet, the three spearheads, the horse-gear and the wagon parts (except for three bronze corner bosses) were destroyed in the war. The grave goods have recently been published by H. Zürn (1987, pls 398–9).

Comments: According to the plan of this grave, it seems possible that it may have contained two inhumation burials. The three fibulae and the iron spearhead to the W of the inhumation with

the gold neck-ring could belong to a second (?male) burial. As almost all of the wagon parts were destroyed in the war, the catalogue entries for the wagon have necessarily been based on Paret's publication (1935a).

Wagon and harness finds:

- 1) Tyres: According to Paret, the wheels had a diameter of about 900 mm. The tyres of type VII were 37–40 mm wide and 7–8 mm thick, the edges of the tyres were slightly bent down leaving a width of 30 mm for the felloes. A few tyre nails were preserved but, according to Paret, there were remarkably few. Lost. (Paret 1935a, pl. 1)
- 2) Naves: The naves of type Cannstatt were covered with ribbed iron sheet and measured 430 mm in length. The ends of each nave were terminated by an iron nave-cap, 130 mm in diameter, with an axle-channel 55 mm in diameter. Each nave-sheathing is put together from six segments. The individual segments never show a join and they must therefore have been hammered from single pieces of iron sheet. According to Paret the iron sheet originally had a thickness of 0.5–0.8 mm. The ribbing is triangular in cross-section. Lost. (Pl. 48, 1)
- 3) Axle-caps: The axle was terminated by an iron axle-cap of type Wellenburg, with a circular flange corresponding in diameter to the nave. The axle-cap had a cylindrical neck and a domed, hemispherical head. Holes were provided for linchpins, the original form of which is not known. Lost. (Fig. 72, 7; Paret. 1935a, pls 6, 3; 9, 1)
- 4) Spokes: Each wheel had ten spokes; the nave sheathing had oval 'shadows' where the spoke-bases met the nave, measuring 50 × 56 mm. The spokes probably tapered, considering that the felloe was only 30 mm wide at the tyre. Lost. (Pl. 48, 1)
- 5) Wagon body: Only the sides of the wagon-box were preserved. They were covered with bronze sheet and, in places, this had preserved the wooden sides. The sides were 143 mm high and articulated in six zones of decoration, of which the third and fifth from the top were sunk 7 mm deeper than the rest. One fragment shows a join in the bronze sheet, covered by a 22 mm wide strip of bronze sheet decorated in the same manner as the rest of the side of the box. The bronze sheet was decorated with three types of punch: a small animal-like figure, a human figure with its arms raised and a four-legged animal with a long tail (horse). The first, third, and fifth zones of decoration are filled exclusively with the small animal-like punch. In the second, fourth and sixth zones of decoration, rows of three or four 'men' alternate with rows of three or four 'horses'. Lost. (Pl. 48, 5)
- 6) Corner-bosses: The four corners of the wagon-box were capped with bronze corner-bosses. Remains of three corner-bosses survive, with a hemispherical dome measuring 64 mm in diameter and a square base-plate measuring 80 × 80 mm. Two sides of the base-plate were slightly bent down. In each corner of the base-plate was a hole for a large spherical-headed iron nail. (Pl. 48, 2–4)
- 7) Dimensions of wagon: The wagon-box measured about 0.7 m in width and about 1.8 m in length (corresponding to the wheel base). The gauge of the wagon was about 1.25 m (from tyre to tyre).
- 8) Iron fragments: Paret published a photograph of iron objects, all now lost, which were found in the SE corner of the grave (1935a, pl. 5, 2). An iron band 32 mm wide and roughly 80 mm in diameter with looped ends, may have come from the wagon (1935a, pl. 5, 2, 9). A large iron ring, almost 110 mm in diameter, seems too large to have formed

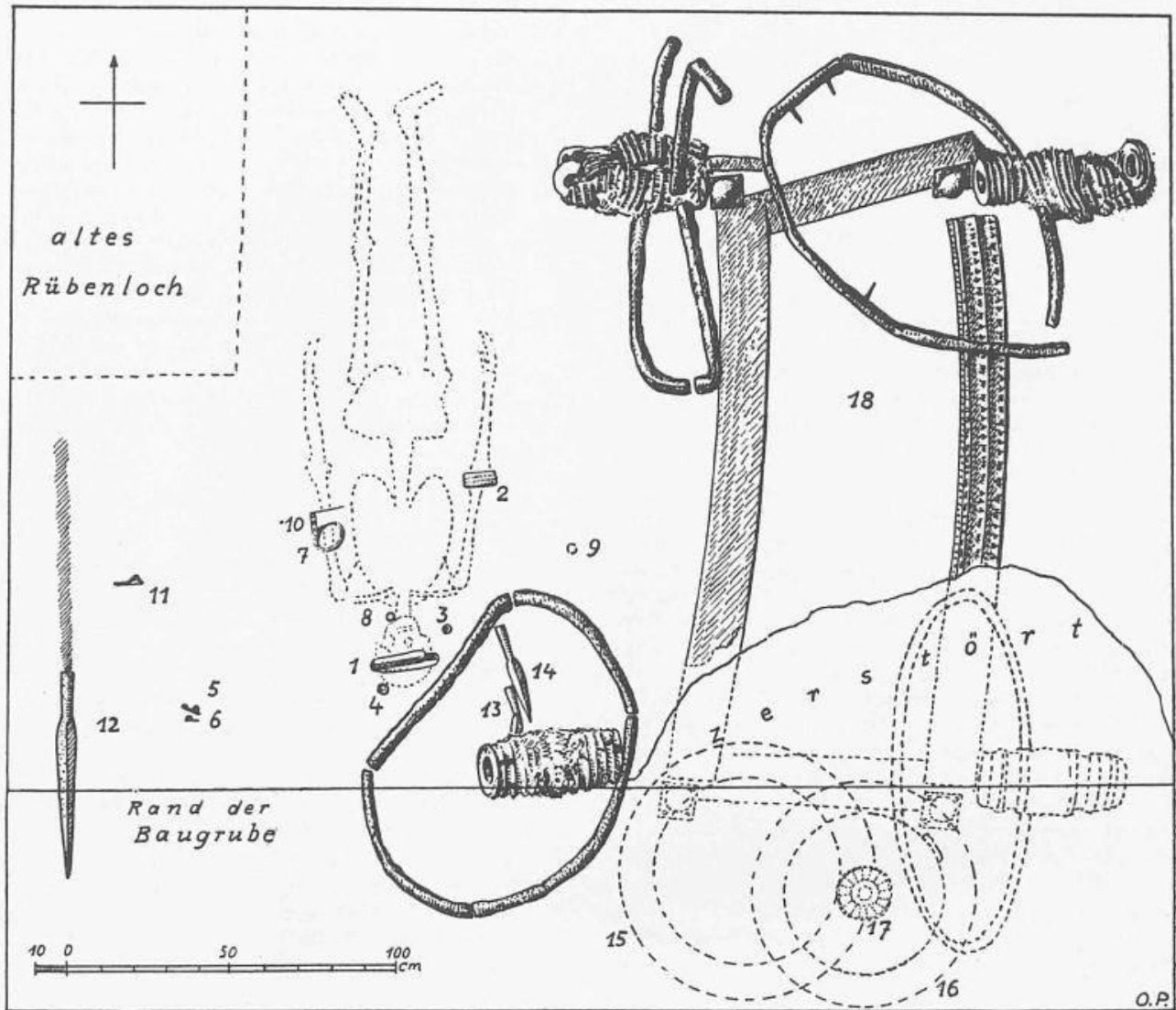


Fig. 174 Stuttgart-Bad Cannstatt, grave 1: plan of the grave chamber (after Paret 1935a).

part of the horse harness and may also have been a wagon component (1935a, pl. 5, 2, 6). The function of certain other iron fragments is unclear (1935a, pl. 5, 2, 7–8.10–12).

- 9) Horse-gear: Also from the SE corner of the grave are the remains of iron horse-gear (all lost): two mouth-piece fragments, probably from two separate bits (Paret 1935a, pl. 5, 2, 13–4); five or six round iron rein-knobs, diameter ca. 23 mm, one or two of which are rusted onto the iron 'check-piece' (ibid. 1935a, pl. 5, 2, 1–4); an angular hollow iron object, probably a cheek-piece, flat oval in cross-section with a longitudinal seam showing that it was put together from two halves (preserved length ca. 86 mm, ibid. 1935a, pl. 5, 2, 4); iron 'toggle', thickened in the middle, one end is ring-shaped, the shape of the other end is unclear (ibid. pl. 5, 2, 5).

Museum: Württembergisches Landesmuseum, Stuttgart (inv. nos A.34,165–177).

91 Stuttgart – Weilimdorf (Kreis Stuttgart, Reg.-Bez. Stuttgart)

References: Anon. 1928, 41–42; Anon. 1930, 34–37; Goessler

1930b, 161–164; Zürn 1956, 12; ibid. 1975, 100–102; ibid. 1987, 191f.

Description: This tumulus was excavated in 1936 by U. Binder. The tumulus belonged to a group of nine tumuli, seven of which were excavated in 1928, 1969 and 1970. Sadly, it is impossible to be certain which tumulus Binder excavated. Zürn (1975, 100) states that Binder excavated tumulus 9 which, in a later excavation by the Landesdenkmalamt (1969), was found to contain no finds. Schiek, however, remembers that Binder said that he 'excavated a tumulus already opened by Veeck' (excavations of 1928: tumuli 2, 3, 4, 6 and 7), and he suggests that Binder excavated tumulus 7 (personal communication).

According to Zürn (1956, 12), Binder's excavations uncovered five arm-rings, leather fragments decorated with little bronze buttons and 'remains of naves with bronze fittings and iron nave-caps'. The wagon finds are now lost. Binder made a reconstruction drawing of a nave, which seems to have an iron nave-head, an iron nave-stock ring and a conical nave-neck.

Museum: The bronze arm-rings from Binder's excavations are to be found in the Universitätssammlung, Institut für Vor-und Frühgeschichte, Tübingen. The wagon parts are lost.

92 Sulz am Neckar

(Kreis Rottweil, Reg.-Bez. Freiburg)

References: Klemm 1891, 85–88; Bach 1893, 6; Hölder 1895, 25; Klemm 1895, 44–45; Paret 1935a, 21; Sievers 1982, 37 and pl. 24, 131; Zürn 1987, 167f.

Description: A tumulus about 18–20 m in diameter and 2.80 m high was excavated in 1891. The excavator found iron tyres, bronze nave sheathings and spokes from a four-wheeled wagon. An iron dagger with remains of its scabbard, some rings and an iron (?)spearhead with remains of a bronze rivet were also found. No remains of the burial itself were uncovered. The grave was found at a depth of 2.80 m; 1.30–1.40 m above this was a burnt layer with ash and charcoal. A stone ring ca. 17 m in diameter probably marked the original diameter of the tumulus.

The inventory of the Württembergisches Landesmuseum also notes two pottery sherds. Among the wagon finds in the museum there is also a bronze spoke shoe.

Finds:

- 1) Two complete bronze-covered naves survive today (type Erkenbrechtsweiler). The ends of the naves are formed by iron nave-caps with an axle-channel 50–55 mm in diameter. The nave-head ring is formed by a bronze ring with an angular cross-section, with linear engraved decoration. Each nave-neck is made of bronze sheet in two halves, fastened by two ribbed bronze strips and iron nails with bronze heads 12 mm in diameter (Drescher 1958, pl. 19, 'Sulz'). Towards the centre of the nave the bronze nave-neck sheathing is decorated by three or four ribs, interspersed with point boss decoration. The widest part of the nave-neck sheathing is fixed to the wooden nave by a further series of iron nails with spherical bronze heads likewise 12 mm in diameter. The naves have a length of 420 mm. The centre of the nave is free of bronze sheathing and shows the remains of sockets for eight spokes. (Pl. 49, 1)
- 2) About 32 fragments of iron tyres and iron tyre nails survive (type VC). The tyres are 19–20 mm wide and have a

slightly concave cross-section in order to accommodate the nail heads. The nail heads are roughly 48–57 mm long and project 6–7 mm above the tyres, thus effectively doubling the thickness of the iron tyre. The nails are fitted every 50–60 mm and the nail heads almost touch each other. The tops of the nail shanks are rectangular in cross-section, measuring ca. 13 × 6 mm. The nails taper to a point, the longest penetration of a nail shank being about 70 mm. The tyres were badly burnt and distorted during the war and it is today impossible to measure their original diameter. However, Klemm reported a diameter of 700–800 mm (Klemm 1891, 86). (Pl. 50A, 1–2)

- 3) Bronze spoke shoe with an internal diameter of ca. 25 mm and an external diameter of at least 52 mm. The bronze sheet is ca. 1 mm thick. (Pl. 50A, 3)
- 4) Iron dagger, one of Sievers' 'Dolchmesser und Dolche mit bronzedrahtumwickelter Scheide, Variante Sulz'. Lost. (Pl. 49, 2)
- 5) Metal rings. Lost.
- 6) Fragment of an iron (?)spearhead with bronze rivet. Lost.
- 7) Two pottery sherds. (Zürn 1987, pl. 329, 11)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. nos A.1150–1151).

93A Tannheim, tumulus I

(Kreis Biberach, Reg.-Bez. Tübingen)

References: Geyr and Goessler 1910, 26; Paret 1935a, 25; Nestler-Wocher 1966.

Description: This tumulus was badly disturbed by agricultural activity. The excavation by Freiherr Geyr von Schweppenburg in 1907 found disturbed remnants of iron and pottery sherds. The excavator states that the tumulus definitely contained a wagon: a wheel segment (? iron tyre) with wood and a nail rendered this beyond question. The finds have not been preserved.

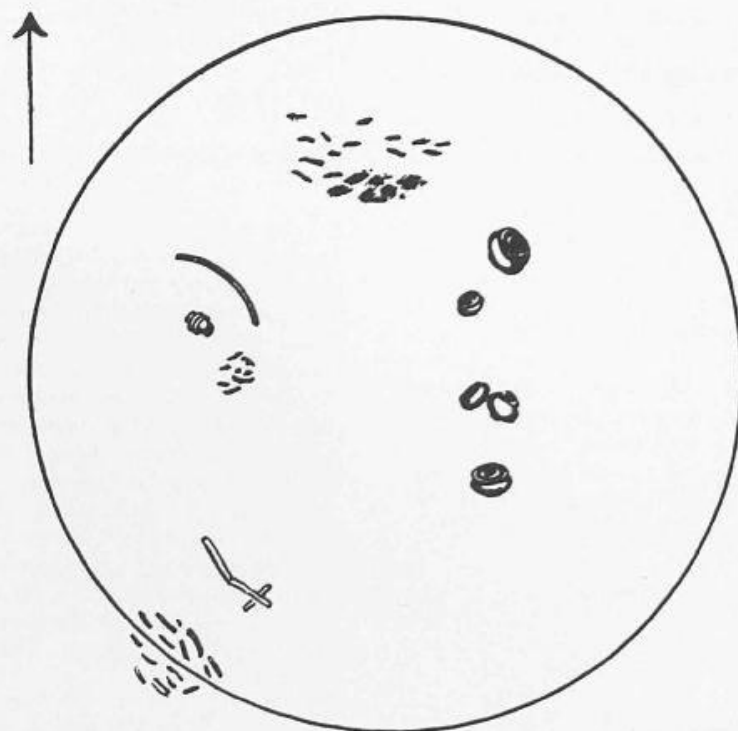


Fig. 175 Tannheim, tumulus VI: plan of the tumulus (after Geyr and Goessler 1910). – Scale 1:100.

93B Tannheim, tumulus VI

(Kreis Biberach, Reg.-Bez. Tübingen)

References: Eggmann 1862, 351-352; Koch 1904, 36-41; Geyr and Goessler 1910, 33-34; Paret 1935a, 25; Nestler-Wocher 1966.

Description: This tumulus was first opened by Eggmann in 1833 or 1837, by means of two crossed trenches. He reportedly found charcoal, but no other finds. However, the excavations of Freiherr Geyr von Schweppenburg in 1904 brought to light numerous sherds and iron fragments in the fill of Eggmann's trenches, showing how careless the earlier excavators must have been. The tumulus had a circumference of 62 m and was 1.90 m high. The base of the tumulus was occupied by a burnt layer which also contained the grave finds. 400 mm above this was another burnt layer, 100 mm thick. The position of the finds had been seriously disturbed by Eggmann's excavation.

2.2 m N of centre were numerous iron fragments from a wagon: 'breitere und schmalere Platten, flach und gewölbt'. 1.8 m NW of centre lay part of a wheel: the tyre was reportedly 20 mm wide and 15 mm thick; wood from the felloe was still fixed to the tyre by three nails; at one point the wood seemed to have been very carefully put together. 'Zwei Speichen konnten mit 6 cm Länge, 2 cm Breite und 7 cm Abstand voneinander gemessen werden. Je ein Nagel hielt die Speiche fest, der durch den Reifen und die Felge in die Speiche hinein reichte'. 500 mm S of the tyre segment lay remains of the nave, which was sheathed with an iron band 70 mm wide.

4.5 m SW of the centre lay the remains of a second wheel and between this and the centre of the tumulus was a bent piece of wood, 1.3 m long and 120 mm thick. A cross-bar 200 mm long and 120 mm thick was found at the S end of the piece of wood. Koch describes the wooden object thus: 'eisenbeschlagen, und an der breiten Ostecke und an der langen Südkante mit zahlreichen eisernen Ringen bestetzt, von denen 7 sich zusammensetzen ließen; am Westende ein rechtwinkliges Eisenbeschlag mit großem Nagel, dem zu beiden Seiten Holzreste entsprechen, was auf eine vordere Querstange schließen läßt' (1904, 39). Here were found the remains of an iron bit, seven bronze knobs, two bronze and six iron rings. Geyr and Goessler suggest that this piece of wood could have been the wagon pole (1910, 33-34). To the E of the wagon remains and horse-gear were at least seven pottery vessels. Koch also mentions an 'iron dagger', 320 mm long, E of the N wheel.

Comments: According to the published plan of the grave finds (Fig. 175), the wagon parts were distributed as much as 8 m apart from each other. This can presumably be explained by disturbance caused by Eggmann's excavations. Geyr and Goessler's detailed description of the wagon remnants W of the centre of the tumulus (1910, 33), especially the observation of two spokes 70 mm apart from each other, cannot be taken seriously - in this case they must have been referring to tyre nails, apparently preserved to a length of 60 mm.

Finds:

- 1) Only two tyre fragments remain, showing a width of ca. 24 mm. The tyre seems to have been flat-topped and large-headed nails may have been used, although these have not survived. The sides of the tyre are bent down to form sides roughly 10 mm high. One tyre fragment has a nail and remains of wood from the felloe showing diagonal grain. The nails were apparently spaced 70 mm apart. (Pl. 51A, 6)
- 2) The naves were sheathed with two kinds of iron band. Two narrow bands, 18-19 mm wide, encircled the central part of

the nave, on either side of the spokes (Figs 65, 2; 175). Nine fragments of this type of iron band survive, frequently carrying remains of wood from the nave (Pl. 51A, 1-3; Fig. 65, 2). Two wider bands, 56-69 mm wide, were provided for the nave-necks. Four fragments of such wide bands survive, one of which showed a join with two iron nails. Some of the fragments bear remains of textiles (Pl. 51A, 4-5). On Geyr and Goessler's plan (Fig. 175) the wider bands appear to have a smaller diameter than the narrow ones. Today, the iron bands are very badly corroded and have been reconstructed from numerous small fragments, so that an accurate measurement of their diameter is impossible. However, the narrow bands appear to have had a diameter of ca. 120 mm.

- 3) Remains of an iron horse bit. Lost.
- 4) Six iron rings, of which only one fragment survives, diameter 50 mm.
- 5) Two bronze rings, one of which survives, diameter 37 mm.
- 6) Seven bronze ring-footed rein-knobs, of which six survive. Some still contain remains of the leather reins. Diameter 16 mm. (Geyr and Goessler 1910, pl. 12, 12-3)
- 7) 'Iron dagger', surviving length 320 mm; more probably a sword.
- 8) Seven pottery vessels.

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. 3255).

93C Tannheim, tumulus VIII

(Kreis Biberach, Reg.-Bez. Tübingen)

References: Geyr and Goessler 1910, 36; Paret 1935a, 25; Nestler-Wocher 1966.

Description: This tumulus was excavated by Freiherr Geyr von Schweppenburg in 1905 (circumference 54 m, height 1.8 m). At a depth of 1.6 m the excavators found a few sherds and fragments of iron. 100 mm below this was a hard burnt layer, which contained the grave finds (Fig. 176). The wagon remains were found in the W half of the tumulus and comprised two wheels: 'die Naben, die mit Eisenbändern umschlossen waren, hatten Holzkerne, von denen die Speichen zu den Nägeln der Reifen hinliefen und teils sichtbar waren' (Geyr and Goessler 1910, 36). S of the wheels were two iron horse bits, two bronze rings and two iron rings. Another iron ring was found among the southernmost wheel remnants. The excavators found various well-preserved remnants of wood, which may have stemmed from the grave chamber.

Comments: Geyr and Goessler regarded this as a two-wheeled vehicle, but from the plan of the finds, it seems certain that only half of the vehicle was brought to light (Fig. 176: probably the E half, judging from the position of the horse-gear). The complete absence of other grave goods, particularly pottery, shows clearly that only part of the grave was uncovered.

Finds:

- 1) Iron tyres and iron nave fittings from two wheels. Lost.
- 2) Two iron horse bits. Lost.
- 3) Three iron rings. Lost.
- 4) Two bronze rings. Lost.

93D Tannheim, tumulus XVI

(Kreis Biberach, Reg.-Bez. Tübingen)

References: Koch et al. 1903, 167-172; Geyr and Goessler 1910, 50-51; Paret 1935a, 26; Nestler-Wocher 1966.

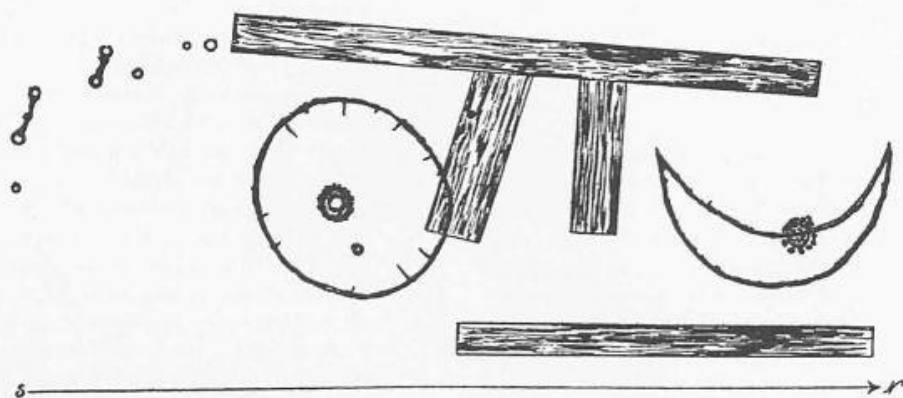


Fig. 176 Tannheim, tumulus VIII: plan of the grave finds (after Geyr and Goessler 1910). – Scale 1:30.

Description: This tumulus was excavated by the Ulm Altertumsverein in 1901 (height 2.3 m, diameter 17 m). Sherds were found at a depth of 300 mm, and again at a depth of 1.5 m. At a depth of 1.6–1.7 m was a burnt layer. In the burnt layer were animal bones and remains of four wheels (interpreted by the excavators as shields). The excavators also noted traces of 'spears' and 'swords' in the burnt layer, between the 'shields'. The report (Koch et al. 1903, 167ff.) mentions the diameters of the wheels as 1 m, 1 m, 0.75 m and 0.60 m respectively; from the sketch plan (ibid. 168, fig. 9) the four naves of the wagon lay in a square of 2 × 2 m.

Comments: The reported 'traces of spears and swords' seem doubtful: if they were made of iron they would presumably have survived (judging from the wagon remains). Note that Geyr and Goessler say that the naves were 'in verschiedenen Wulsten gewölbt' (as in tumulus VIII), suggesting the ribbed form of the Breitenbronn nave type. The report says that under the tyre of one of the wheels the form of the wood was clearly preserved and had a thickness of 20–25 mm. The measurement probably refers to the thickness of the felloe just below the tyre.

In the Württembergisches Landesmuseum, certain iron wagon finds are preserved under inv. no. 3264, 6a.b. These are labelled 'tumulus XVIII', although such finds were not reported from that tumulus. It seems probable that they are, in fact, from tumulus XVI.

Finds:

- 1) 15 fragments of iron tyres and tyre nails. The tyre fragments have a width of about 25 mm and have an angular profile of type II. The tyre nails are square in cross-section. The longest preserved penetration is ca. 60 mm. One nail has remains of wood grain, but it is difficult in this case to determine whether the grain runs horizontally or diagonally. The shape of the nail heads is impossible to determine. (Pl. 51B, 3–6)
- 2) Three fragments of iron nave fittings of type Breitenbronn. Two fragments show the complete profile of the nave-head, which was made in one piece, and a third fragment comes from the nave-neck. The nave-head fittings form an axle-channel ca. 44 mm in diameter. (Pl. 51B, 1–2)
- 3) Iron ring, external diameter ca. 66 mm.
- 4) Sherds. Lost.
- 5) Animal bones. Lost.

Museum: Württembergisches Landesmuseum, Stuttgart, (inv. no. 3264, 6a.b).

93E Tannheim, tumulus XXI

(Kreis Biberach, Reg.-Bez. Tübingen)

References: Geyr and Goessler 1910, 56; Paret 1935a, 26; Nestler-Wocher 1966.

Description: A very low tumulus, 500 mm high, almost destroyed by agricultural activity, was excavated by Freiherr Geyr von Schweppenburg in 1909. Various wagon remains, as well as an iron horse bit and a bronze rein-knob, were found spread over an area of 4 × 3 m. All the finds lay on a burnt layer. No sherds were found.

Finds:

- 1) Two fragments of iron nave fittings of type Breitenbronn. The two fragments allow the whole of the nave-head profile, and part of the nave-neck, to be reconstructed. The nave-head was made in one piece. (Pl. 51C, 1)
- 2) Seven tyre fragments of type II. The tyre probably originally had a width of about 25 mm. Owing to corrosion, little can be said about the form of the tyres and nails, although one fragment (Pl. 51C, 2) could show a long nail head. (Pl. 51C, 2–4)
- 3) Three iron rings, possibly from the horse bit.
- 4) Fragment of an iron horse bit, with a bronze ring-footed rein-knob adhering by corrosion.

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. 3267).

94A Tübingen – Bebenhausen, tumulus of 1897

(Kreis Tübingen, Reg.-Bez. Tübingen)

References: Bach 1897, 3; Sixt 1901, 5–6; Paret 1935a, 20–21; Zürn 1987, 200.

Description: This tumulus was excavated by Weiblen in 1897 and measured 8–10 m in diameter with a height of 2 m. At a depth of 1 m the stone core was discovered. When the first layer of stones was removed, a large number of pottery vessels was found. After removal of a further layer of stones an inhumation burial was uncovered, to the left of which was a 'shield' ('ein Schild aus Eichenholz, mit Bronzeblech überzogen und mit Bronzenägeln beschlagen, von welchem aber nur der Schildbuckel einigermaßen erhalten war': Bach 1897, 3). The grave also contained a fragmentary sword, an iron arrowhead, a bronze dress-pin, and various iron fragments. The skeleton lay

on stone slabs. According to Sixt (1901, 5), the finds were kept by the excavator; perhaps they can be identified with the objects illustrated by Zürn (1987, pl. 426A, 1-6). According to Zürn the 'sword' was really an iron dagger similar to his pl. 427, C1.

Comments: Both Sixt and Paret say that the 'shield' was really a wheel, and from Paret's description ('iron nave-cap decorated with bronze nails; traces of wood still survive on the nave-cap'), it is clear that he had studied the 'nave-cap' personally. For this reason, the so-called 'shield' parts were very probably wheel components.

94B Tübingen - Bebenhausen, tumulus I of 1901

(Kreis Tübingen, Reg.-Bez. Tübingen)

References: Sixt 1901, 5-6; Paret 1935a, 20-21; Zürn 1987, 200.

Description: This tumulus was excavated by Sixt in 1901. It contained a cremation burial with about six pottery vessels, the rusted remains of a nave-cap and an iron dagger. The wagon finds have been lost, the surviving grave goods are illustrated by Zürn (1987, pls 426B; 415B, 1.4).

95 Ulm - Eggingen

(Kreis Ulm, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 36.54; Goessler 1911, 28; Paret 1935a, 23; Zürn 1961, 21; *ibid.* 1987, 45.

Description: This tumulus was excavated by von Föhr in 1885. Roughly in the middle, only 2½' (0.72 m) under the surface, he found numerous fragments of iron tyres, fragments of bronze sheet (which he interpreted as remains of nave fittings) and a small excised bronze wheel ('ein massives ausgekerbtes Bronzerädchen'). On some of the bronze fragments, remains of wood were recognisable. On the base of the tumulus were two inhumations whose goods were published by Zürn (1961, pls 11D; 12C, 1-6). References by Goessler and Paret suggest that these finds were at that time (in 1911 and 1935 respectively), not to be found in the Württembergisches Landesmuseum. However, the 'bronze wheel' has been identified among the finds from Sankt Johann in the Württembergisches Landesmuseum, and a single bronze nave-neck sheathing could also possibly be assigned to this grave (the case has been argued in the catalogue entry for Emerkingen; see cat. no. 60).

Finds:

- 1) Iron tyres. Lost.
- 2) One bronze sheet cover from a conical nave-neck. The bronze sheet bears two raised ribs near the end closest to the nave-stock. The seam of the bronze sheathing was fastened by a row of bronze nails with large flat round heads. (Pl. 51D, 2)
- 3) Bronze 'terminal', consisting of a cylindrical socket 30 mm long and 22 mm in diameter, with a rivet-hole, and the remains of a flat plate originally carrying decoration formed by an inset circular groove and triangular notches. (Pl. 51D, 1)

Museum: Württembergisches Landesmuseum, Stuttgart.

96 Villingen-Schwenningen, 'Magdalenenberg', grave 1

(Schwarzwald-Baar-Kreis, Reg.-Bez. Freiburg)

References: Spindler 1971.

Description: This tumulus was first excavated in 1890 and later

examined in 1970-1973. In 1890, the tumulus measured 106 m in diameter with a height of 8 m; however, the original height of the tumulus probably reached 10-12 m. In 1890, E. Wagner and K. Schumacher confined their excavation to the central burial which, to their disappointment, had been robbed in antiquity. In contrast, K. Spindler undertook a complete excavation of the tumulus and uncovered 126 secondary graves containing 136 burials.

The excavations of 1890 discovered a large wooden grave chamber on the old ground surface, measuring 8 x 5 m (Spindler 1971, Beilage). The chamber was covered by a stone core. The roof of the chamber was found to have a hole measuring 2-3 x 2-3 m in the SW corner, which must have been made by the grave robbers. Inside the chamber were numerous small fragments of oak wood, some with axe marks, which stemmed from the robbers' entry to the chamber. The robbers also left behind fragments of wooden spades which had probably broken during use.

The chamber contained a few fragmentary remnants of the grave goods, including important wagon remains. Bones from the inhumation burial (probably an adult male, according to G. Gallay, in Spindler 1971, 48-9), and from a young pig also survived.

Comments: The robbery of this grave must have taken place when the bodies of the inhumation and the pig were completely decomposed because the bones were found scattered completely irregularly around the chamber. On the other hand, the robbery certainly took place before the collapse of the chamber roof. In fact, samples of wood from this grave have been subjected to dendrochronological study: oak wood from the chamber was dated to 622 BC, and samples from three of the wooden spade fragments dated to 575 BC. It would seem, therefore, that the chamber was robbed 47 years after the burial.

Finds:

- 1) Six fragmentary spokes made from malaceous fruit wood. The fragments allow the original form of the spokes to be fully reconstructed. The spokes measured ca. 272 mm in length, of which ca. 55 mm was formed by the nave tenon and ca. 21 mm by the felloe tenon. The spokes tapered somewhat towards the middle and had a circular cross-section, ca. 41 mm in diameter at the nave end, and ca. 21 mm in diameter at the felloe end. The spokes were provided with a leather covering which was fastened by two rows of 15 iron nails and apparently also stuck to the spoke by pitch. The tenons at either end of the spoke were set at right-angles, the nave tenons parallel with the axle and the felloe tenons parallel with the tyre. (Pl. 52, 1)
- 2) Fragments of iron tyres of type VC, and felloes of ash wood. The tyres were 22-23 mm wide and ca. 750 mm in diameter. The tyre nails had long rectangular heads (15-16 x 58 mm) which were set 58 mm apart so that the heads touched. The longest nail penetration, 48 mm, probably indicates the original height of the felloe (Pl. 52, 3). The felloe measured about 35 mm in width on its inner side compared to ca. 22 mm on the outer (tyre) side. The felloes were covered with leather, fastened with iron nails and stuck with pitch. On the outer side of the felloe there were also decorative iron nails. On one felloe fragment remains of two spoke sockets survive, originally spaced 250 mm apart (Pl. 52, 6-7). Considering the diameter of the wheel, this indicates that the wheels of this wagon had eight spokes. One felloe fragment (Spindler 1971, pl. 6, 3) had one flat smooth end which must have been a join. (Pl. 52, 3-7)

- 3) 570 mm long strip of ash wood, with leather covering, and five further fragments. (Spindler 1971, pl. 7, 1-6)
- 4) Thicker ash wood strip, 600 mm long, with nails originally from a leather covering. One end is stepped. Three similar fragments. (ibid. pl. 7, 7-9)
- 5) 13 oak rods, 115-145 mm long, one end rectangular and the other end round. (ibid. pl. 8, 1-13)
- 6) Heavy piece of ash wood, 495 mm long, each end with a thickened rectangular socket. Both ends also have a nail hole. (ibid. pl. 9, 5)
- 7) Numerous fragments of ash wood, some with nails from a leather covering. (ibid. pls 6, 9-14; 9, 3.4; 10, 1; 11, 3)
- 8) Fragment of twisted iron rod, square in cross-section. Probably from a linchpin. (Pl. 52, 2)
- 9) Two fragments of bent iron rods. (Spindler 1971, pl. 3, 2.3)
- 10) Six looped iron pendants, possibly from the linchpins. (ibid. pl. 3, 6.10.11.16-18)
- 11) One iron fragment, possibly from a looped pendant. (ibid. pl. 3, 7)
- 12) Four fragments of thin iron sheet decorated with point-bosses. One fragment has remains of a zig-zag edge and nail holes. (ibid. pl. 1, 12.13)
- 13) Fragment of iron sheet with embossed dots-and-circles. (ibid. pl. 3, 15)
- 14) Bronze sheet yoke-band decorated with embossed dots-and-circles and point-bosses (ibid. pl. 1, 5). Fragments of a second (ibid. pl. 1, 14).
- 15) Fragment of an iron ring bearing a fragmentary looped iron band and two looped twisted iron rods. Probably from a yoke-chain. (ibid. pl. 3, 4)
- 16) Another fragment, probably from the same (?) yoke-chain. (ibid. pl. 3, 1)
- 17) Four bronze rein-knobs, comprising a flat disc 28 mm in diameter, a central spike and a longitudinally-ribbed rear loop. (ibid. pl. 2, 3.4.7.8)
- 18) One bronze ring-footed rein-knob, comprising a flat disc 38 mm in diameter, with a central spike. (Fig. 105, 3; ibid. pl. 2, 6)
- 19) Triangular bronze looped pendant, length 55 mm. (ibid. pl. 2, 5)
- 20) Small iron toggle. (ibid. pl. 3, 8)
- 21) Remains of an iron chain, of which three or four fragmentary links are preserved. (ibid. pl. 3, 9.12)
- 22) Four bronze rings, diameter 25 mm (ibid. pl. 1, 1-4); one bronze ring, diameter 22 mm (ibid. pl. 3, 13); one bronze ring, diameter 15 mm (ibid. pl. 1, 7).
- 23) Three bronze rings, each with a projecting rod which is square in cross-section. Three simple bronze rings seem to belong to these objects. (ibid. pl. 1, 6.8.9)
- 24) Bronze ring, triangular in cross-section. (ibid. pl. 1, 10)
- 25) Perforated bronze sheet 'tutulus', diameter 28 mm. (ibid. pl. 1, 11)
- 26) Bronze water-bird sitting on a nail with square cross-section, height 41 mm. (ibid. pl. 2, 1)
- 27) Cast bronze triangular object, two corners of which are provided with a pair of rings. (ibid. pl. 2, 2)
- 28) Fragment of bent iron sheet. (ibid. pl. 3, 14)
- 29) Two wooden rods of malaceous fruit wood, possibly remains of a bow and arrow. (ibid. pl. 9, 1.2)
- 30) Remains of wooden spades. (ibid. pls 10, 2-4; 11, 2.4)
- 31) Fragmentary wooden vessel. (ibid. pl. 11, 1)
- 32) Numerous fragments of oak wood, often with axe marks, probably deriving from the robbers' entry to the chamber.
- 33) Leather remains. (ibid. 40, fig. 3)
- 34) Textile remains.

35) Pig skeleton.

Museum: Stadtmuseum, Villingen-Schwenningen.

97 Winterlingen, tumulus III

(Zollernalbkreis, Reg.-Bez. Tübingen)

References: Von Föhr 1892, 22-23; Paret 1935a, 21-22; Zürn 1987, 227.

Description: This tumulus was excavated by von Föhr in 1884. According to the excavator it was large and had a stone core in the form of a right-angle open to the SW. A burnt layer lay at a depth of 8' (1.29 m) from the top of the tumulus; under it the excavators found post-holes. An inhumation grave was found in the stone core and, at a depth of 10' (2.87 m), the metal parts of a four-wheeled wagon. Von Föhr noticed that the iron tyre of one wheel was flat, whereas the other three were convex in profile. Among the wagon parts was an iron knife, 385 mm long. Otherwise, the excavators only found a few sherds.

Finds:

- 1) Metal parts from four naves of type Winterlingen, today fitted onto reconstructed wooden naves. The nave fittings consist of an iron nave-stock ring with 'C'-shaped cross-section, a conical nave-neck of bronze sheet and an iron nave-head formed by a larger inner ring and a smaller outer ring. The nave-stock ring was decorated with parallel lines of inlaid bronze. The bronze sheet nave-neck has a seam which is joined by small flat or domed bronze nails. The larger inner ring of the nave-head is decorated with inlaid bronze dot-and-circle motifs. This is executed not only on the rim of the ring, but also on the outer face (Pl. 54, 1). The smaller outer ring of the nave-head also probably carried inlaid bronze decoration; only one fragment survives - with linear ornamentation (Pl. 54, 2). The original length of the naves is unknown. The outer nave-head ring has an axle-channel 52-57 mm in diameter. The individual parts of the naves vary quite radically in execution. For example, the nave-stock ring on one nave (Pl. 54, 2) is only 9 mm wide, while on another nave (Pl. 53, 3) it is 15 mm in width (compare also Pl. 54, 3.4). Likewise, the outer nave-head ring may be angular (Pl. 54, 1-2) or rounded (Pl. 53, 3) in shape. The bronze nails on the nave-neck are also of different types, flat or domed. (Pls 53, 3; 54)
- 2) Three tyres with profiles of type IIIG. The profiles vary considerably, from semi-circular to curved in cross-section. The width of the tyres varies from 19-24 mm. The tyres were fixed with small nails, set 230-285 mm apart, the heads of which do not protrude above the level of the tyre. It seems possible, or even probable, that not all these tyre fragments belong to the Winterlingen wagon. Tyres from other graves, probably including Erkenbrechtsweiler, may have been mixed with those from Winterlingen, which would account for the variety of tyre widths and cross-sections. Nevertheless, the tyres all belong to the same typological group: type IIIG. (Pl. 53, 2)
- 3) One tyre has a different profile and is wider (ca. 28 mm). The profile is flat, with slightly thickened edges. The tyre nails are also different, with large protruding heads, and they are set roughly 485 mm apart. This is obviously the odd tyre noticed by von Föhr. (Pl. 53, 1)
- 4) Iron knife, length 385 mm. (Zürn 1987, pl. 496A, 2)
- 5) Sherds. (ibid. pl. 503B, 1-17)

Museum: Württembergisches Landesmuseum, Stuttgart (inv. no. A. 3333).

98 Unprovenanced

(Württembergisches Landesmuseum, Stuttgart)

The Württembergisches Landesmuseum houses a number of unprovenanced wagon finds, which probably date to the Hallstatt period.

A) About 11 fragments of tyres and tyre nails (type VC). The tyres are about 26 mm wide and are fitted every 85 mm with large-headed nails (heads measuring 65–92 × 15–19 mm). One bent nail shows a felloe height of ca. 74 mm. (Pl. 55A)

B) About 56 fragments of tyres and tyre nails (type VC). The tyres are 19–20 mm wide and are fitted every 40–45 mm with large-headed nails (heads measuring 35–45 × ca. 16 mm). One bent nail shows a felloe height of ca. 73 mm (Pl. 55B, 5). (Pl. 55B)

C) One fragmentary iron linchpin. A small part of the head survives, as well as part of the hole at the lower end. (Pl. 55C)

Museum: Württembergisches Landesmuseum, Stuttgart.

6 BAVARIA**99 Aislingen, 'Oberes Ried', tumulus 1**

(Kreis Dillingen a. d. Donau, Reg.-Bez. Schwaben)

References: Krahe 1983, 30–32.

Description: This tumulus, known as the 'Bühl' or 'Herzogs-hügel', is the largest in the Donaured, 2.3 m high and 60–70 m in diameter. It was excavated by the Bayerisches Landesamt für Bodendenkmalpflege in 1982. In the middle of the tumulus was a wooden grave chamber orientated NW-SE and measuring 5.5 × 3.0 m (Fig. 177). The E half of the chamber had been destroyed, probably by 19th century excavations. In the SW corner of the chamber was a conical-necked vessel (*Kegelhalsgefäß*) and in the N half were the vehicle remains. Among the iron vehicle remains were two bronze plaques with openwork decoration. Slightly N of the conical-necked vessel was an iron ring.

Comments: The iron finds are in a very poor state of preservation.

Finds:

- 1) 73 fragments of iron tyres and tyre nails. The tyres are about 22 mm wide and have a slightly concave profile with bent-over edges (type Ib). The longest piece of tyre preserved was 125 mm long. This piece shows that the tyres were fastened by closely-spaced nails, about 70 mm apart in this case (Pl. 56A, 3). Remains of the felloe are commonly preserved, showing diagonal wood grain. The tyre fragment on Pl. 56A, 4 allows a measurement of the angle of the wood grain of a felloe segment at its join. The wood grain joins the tyre at an angle of 48°, generating a theoretical number of 4.3 outer felloe segments. One fragment of tyre (Pl. 56A, 5) has part of a felloe-clamp still in place. The tyre nails had elongated heads (type A), which probably almost touched each other originally. The longest nail penetration preserved was 36 mm. Krahe reports that the excavators were able to measure a tyre segment *in situ*, which showed an original wheel diameter of about 1 m (Fig. 178). (Pl. 56A, 3–5)
- 2) 29 fragments of iron sheet, mostly curved, frequently with traces of wood adhering. Some of them could be fragmentary felloe-clamps (e.g. Pl. 56A, 6). The function of others is

less easy to understand. Thin iron sheathing is seen on Pl. 56A, 14. On Pl. 56A, 11, on the other hand, there is a fragment of a flat iron sheet with one nail and one bent side; the wood grain shows a join between two pieces of wood, but the fragment seems too big to be a felloe-clamp. Pl. 56A, 15–16 shows further fragments of iron sheet with nails, Pl. 56A, 15 also showing remains of joins between various pieces of wood. (Pl. 56A, 6.11.14–16)

- 3) Curved fragment of iron with thickened cross-section, possibly from around the axle-channel of the nave. (Pl. 56A, 7)
- 4) Two fragments of curved iron bands with 'dumb-bell'-shaped cross-section. (Pl. 56A, 12–13)
- 5) Fragments of three iron rings rusted together. Probably remains of a linchpin. (Pl. 56A, 8)
- 6) Two fragments of circular(?) iron rings, external diameter ca. 56 mm; internal diameter ca. 38 mm; thickness 2 mm. One fragment has two nails preserved. (Pl. 56A, 9–10)
- 7) Several small uncharacteristic fragments of iron; some with remains of preserved wood.
- 8) Two cast bronze plaques with circular bosses and triangular openwork decoration. On one end of the smaller fragment is a tubular iron sleeve. (Pl. 56A, 1–2)
- 9) Iron ring in three fragments, external diameter ca. 50–60 mm. (Krahe 1983, 33, fig. 7, 3)
- 10) Pottery conical-necked vessel (*Kegelhalsgefäß*). (Krahe 1983, 33, fig. 7, 6)

Museum: Stadt- und Hochstiftsmuseum, Dillingen an der Donau (inv. nos 64667–64680).

100 Albertshofen, tumulus of 1936

(Kreis Kitzingen, Reg.-Bez. Unterfranken)

References: Reinecke 1937, 163–164; Wagner 1938, 86; Benninger 1956. Unpublished archive material in the Bayerisches Landesamt für Denkmalpflege, Außenstelle Würzburg.

Description: This tumulus was the larger of two tumuli situated on the border between the forest tracts 'Birkensee' and 'Landwehr'; it was excavated by Huber in 1936 and had a diameter of 22 m and a height of 1.5 m. The excavators found a secondary cremation grave and, under a stone core (diameter 6–8 m, height 1.2 m), a primary inhumation grave with the skeleton orientated (head)SSE-NNW(feet). To the head and feet of the skeleton were two pieces of iron tyres and fragmentary felloe-clamps; the two tyres were 2.2 m apart, positioned with their concave sides facing each other. About 2 m NE of the skeleton was a group of pottery vessels. Reinecke suggested that the primary grave was robbed.

Comments: Reinecke believed that the vehicle remains came from a two-wheeled vehicle. However, the position of the tyres at the head and feet of the skeleton, and their distance apart, would better suit a four-wheeler. The rest of the vehicle remains must have been robbed, probably along with the other metal goods.

Reinecke states that seven pottery vessels were found in the primary grave, while Benninger, in his dissertation, listed 12 vessels. Today it is impossible to distinguish the finds from the various excavations of 1936 and 1937, and so Benninger's account must be used – however, it remains doubtful whether all 12 vessels belonged to the primary grave. The large storage vessel published by Reinecke is the only one which certainly comes from the primary wagon-grave. The descriptions of the various vessels have been taken from Benninger's unpublished dissertation and the illustrations are copied from his plates.

Finds:

- 1) 11 tyre fragments. These have been reconstructed in the Prähistorische Staatssammlung, München, with a diameter of 1.018 m. The tyres had an original width of ca. 25 mm, with a cross-section of type II. The tyre nails had small, roughly rectangular heads and long shanks with rectangular cross-section (type G). The nails, spaced 116–120 mm apart, were often bent over and show a felloe height of 86 mm. (Pl. 57, 6.13)
- 2) Fragments of at least four 'U'-shaped felloe-clamps, each fastened by six nails. These have a height of 67–68 mm and could not have reached around the whole of the felloe, which was 86 mm high. The felloe-clamps have been reconstructed from numerous small fragments, making an accurate judgement of the felloe cross-section difficult. However, Reinecke may have seen the felloe-clamps in better condition, and he stated that the clamps had a maximum internal width of 40 mm and a minimum internal width (at the top) of 25 mm. (Pl. 56B)
- 3) Conical-necked vessel (*Kegelhalsgefäß*), exterior dark gray, neck and rim well polished, lower part roughened. Rim diameter 176 mm, height 320 mm. (Pl. 57, 4)
- 4) Grey-brown storage vessel with slightly roughened lower part. Rim-diameter 240 mm, height 400 mm. (Pl. 57, 11)
- 5) Dark grey-brown storage vessel with roughened lower part. Rim diameter 200 mm, height ca. 380 mm. (Pl. 57, 12)
- 6) Storage vessel with plastic cord on bearing finger impressions, roughened lower part. Height 555 mm. (Reinecke 1937, pl. 38, 2)
- 7) Rim-sherd of a grey-brown conical-necked vessel (*Kegelhalsgefäß*) with thin linear graphite decoration on the neck. (Pl. 57, 7)
- 8) Dark brown well-polished bowl. Rim diameter 230 mm, height 98 mm. (Pl. 57, 9)
- 9) Light brown cup with black blotches and graphited rim. Rim diameter 118 mm, height 60 mm. (Pl. 57, 1)
- 10) Reddish-brown vertical-rimmed vessel with roughened surface. Rim diameter 150 mm, height 145 mm. (Pl. 57, 5)
- 11) Rim-sherd of a grey vertical-rimmed vessel. (Pl. 57, 8)
- 12) Black spherical-shaped vessel with graphite decoration, mostly reconstructed. Rim diameter 110 mm, height 95 mm. (Pl. 57, 10)
- 13) Grey-brown, well-polished bowl. Rim diameter 198 mm, height 85 mm. (Pl. 57, 2)
- 14) Dark grey-brown bowl with conical neck; neck and rim graphited. Rim diameter 220 mm, height 105 mm. (Pl. 57, 3)

Museum: Prähistorische Staatssammlung, München (inv. nos 1966, 1376–1386). Some of the finds are now on loan to the museum of Bad Windsheim.

101 Altdorf

(Kreis Landshut, Reg.-Bez. Niederbayern)

References: Tröltzsch 1884, 76–77.

Description: Freiherr von Tröltzsch mentioned 'eiserne Reife von Rädern' from 'Altdorf bei Landshut', in the museum of the Historischer Verein of Niederbayern.

Comments: The tyres could not be found in the museum in Landshut, and no other reference to them has been made in the literature (but see cat. no. 113).

Museum: Stadt- und Kreismuseum, Residenz, Landshut (finds lost).

102 Augsburg – Kriegshaber, tumulus 1

(Kreis Augsburg, Reg.-Bez. Schwaben)

References: Krämer 1949, 1–8; *ibid.* 1951, 135–137; *ibid.* 1952, 154–155; Kossack 1959, 133–134.

Description: The largest in a group of 24 tumuli was excavated in 1947. A central grave chamber, orientated NNE-SSW and measuring 5.60 × 4.10 m, was detected by soil discolouration; it was originally made of wood and was built on the old ground surface. The chamber was surrounded by a narrow ring-ditch 15 m in diameter.

The E wall of the chamber was occupied by a series of pottery vessels; further vessels were found near the centre of the chamber (Fig. 179). In all, the chamber was furnished with about 13 vessels. The NW part of the chamber was taken up by the wagon: namely the remains of four iron tyres. However, the tyre of the SE wheel had largely been removed by disturbance. The excavator, W. Krämer, reported that the wheels were at least 700 mm in diameter. The back wheels of the vehicle were spaced ca. 800 mm apart and the distance from the front of the front wheel to the back of the back wheel measured ca. 2.60 m. The excavators also found remains of beech wood preserved on the rusted iron tyres.

In the NW part of the chamber were two piles of cremated bones. According to analysis of the cremation, it was found that three individuals were represented (a man, a woman and a child). The fact that cremated bones from the man and woman were found in both piles shows that all three individuals were buried at the same time. Nevertheless, the man's bones were sorted out and predominate in the S pile. Over the man's pile of cremation lay a spear measuring 2.5 m in length (only the iron spearhead and ferrule survived). In the SW corner of the grave chamber were scant remains of iron horse-gear: fragments of iron bits and rings.

 Finds:

- 1) Fragments from four iron tyres; width about 22 mm; type II cross-section. Remains of wood on the nails of the tyres shows the wood grain running in a horizontal direction. The longest nail-penetration measured is 52 mm (Pl. 58A, 3). Some tyre fragments show possible remains of nails with long heads, but the type of nail-head on these tyres remains uncertain. One tyre fragment shows the imprint of a spoke, measuring 28 × 7 mm (Pl. 58A, 6). (Pl. 58A, 1–3.5–7)
- 2) Two fragments of iron horse bits. (Pl. 58A, 8.12)
- 3) Three fragments of iron rings with square cross-section. (Pl. 58A, 9–11)
- 4) Fragment of an iron object showing traces of wood grain and the remains of a nail. (Pl. 58A, 4)
- 5) Two conical iron sockets, one of which survives (except for the tip which is broken off); the socket was fixed by an iron rivet. The two iron sockets were found in vessel no. 5 on Fig. 179. (Pl. 58A, 13)
- 6) Iron spearhead and ferrule. (Kossack 1959, pl. 54, 10)
- 7) About 13 pottery vessels. (*ibid.* 1959, pl. 54, 1–9)

Museum: Römisches Museum, Augsburg (inv. no. VF, 1652–1655).

103 Augsburg – Wellenburg

(Kreis Augsburg, Reg.-Bez. Schwaben)

References: Lieb and Eberlein 1936, 100; Wagner 1937, 211; Kossack 1959, 135.

Description: A large tumulus (diameter 50 m, height 1.75 m),

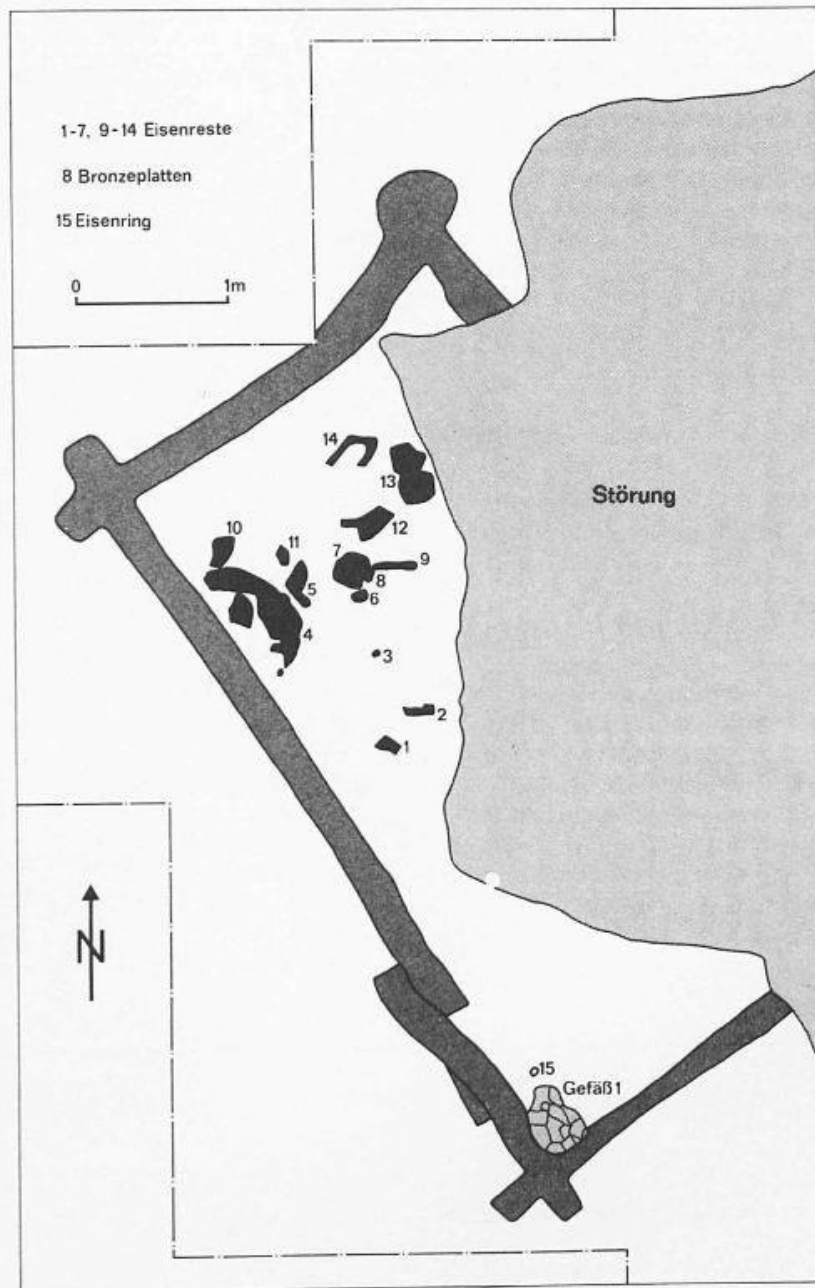


Fig. 177 Aislingen, 'Oberes Ried', tumulus 1: plan of the grave chamber (after Krahe 1983).
— Scale 1:50.

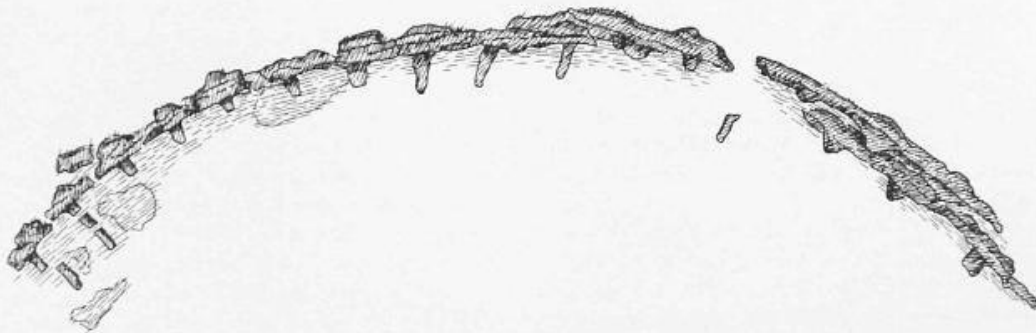


Fig. 178 Aislingen, 'Oberes Ried', tumulus 1: tyre segment found in situ (after Krahe 1983). — Scale 1:3.

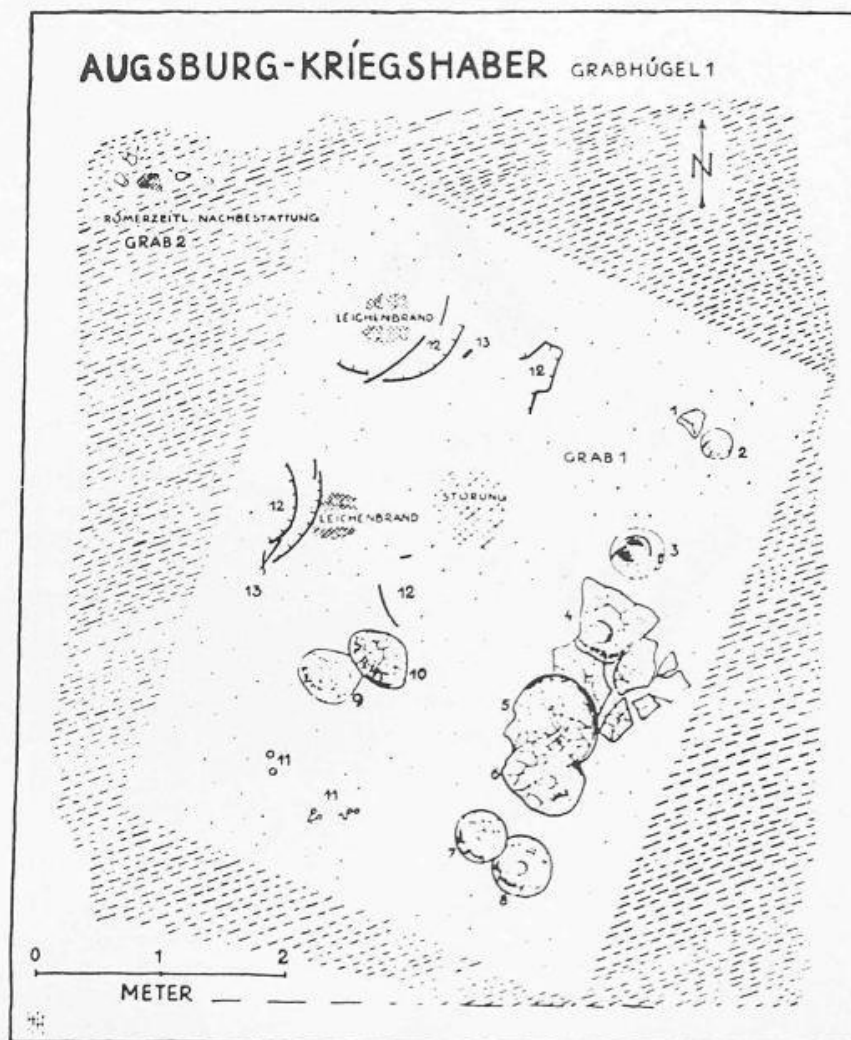


Fig. 179 Augsburg-Kriegshaber, tumulus 1: plan of the grave chamber (after Kossack 1959).

which stood slightly to one side of a group of 12 other tumuli, was excavated in 1935 by Graf Vojtkffy. The first find was a large conical-necked vessel (*Kegelhalsgefäß*); alongside it was a fragment of a gold sheet diadem or shoe cover (compare the gold fittings from Hochdorf and Allenlütten) and a second, smaller pottery vessel. Otherwise, the mass of the finds consisted of wooden remains and iron fragments of a vehicle.

Comments: The excavation of this tumulus seems to have been carried out quite carefully and Graf Vojtkffy apparently wrote a detailed report in a notebook, which cannot now be found. Kossack notes that Holste sketched a conical-necked bowl which may have come from this grave.

Finds:

- 1) Numerous fragments of iron tyres, with type VII cross-section, width 40–42 mm. The nail-shanks had square cross-sections and were relatively small. The nail heads were large and square (type E), measuring roughly 20 × 20 mm. (Pl. 59, 6–9)
- 2) Fragments of iron nave fittings of type Cannstatt. Each nave half was made from five sections of iron sheet. The axle-channel was ca. 62 mm in diameter. The nave-neck was slightly conical in profile, and joined a cylindrical nave-head and nave-stock. (Pl. 59, 1–5)
- 3) Fragments of hemispherical iron axle-caps of type Wellenburg, consisting of a flange (at least 84 mm in diameter) and a hemispherical dome (53 mm external diameter). One fragment preserves a small linchpin, which appears to have had a profiled head. (Fig. 72, 1; Pl. 60A, 1–2)
- 4) Fragments of slightly conical ribbed iron spoke fittings. The bases have a diameter of ca. 45 mm, at the top the diameter is ca. 40 mm. One example (Pl. 60A, 16) appears to be terminated by a piece of iron sheet, but in fact the piece of iron sheet is only joined by corrosion and does not belong. (Pl. 60A, 10, 12–16)
- 5) Numerous fragmentary iron fittings, possibly from the railings of the wagon (box decoration type v). The fittings apparently consist of long curved iron segments (Pl. 60A, 3.5.7.11), to which were joined long strips of iron sheet decorated with three longitudinal ribs (Pl. 60A, 4.6.8–9). (Pl. 60A, 3–9.11)
- 6) Three fragmentary terminals from organic cheek-pieces. One of the terminals is fused by corrosion to a curved piece of iron sheet (Pl. 58B, 12). The terminals consist of a cylindrical, slightly tapering socket, a spherical ribbed head and a short knobbed protrusion. (Pl. 58B, 9.12–13)
- 7) Fragment of an iron ring fitting, probably from an organic cheek-piece. (Pl. 58B, 14)

- 8) Various iron rings with round cross-sections. (Pl. 58B, 7.10–11)
- 9) Various hollow iron knobs, originally nailed to iron sheet, which bears wood grain (elements of wagon-box decoration type v). Some of the knobs are profiled with ribbed decoration. (Pl. 60A, 17–20)
- 10) Numerous iron rein-knobs, with single loops on their rear sides. External diameters: 16, 31, 47 mm. (Pl. 58B, 5–6)
- 11) Fragment of a gold diadem or shoe fitting with embossed decoration. (Pl. 58B, 3)
- 12) Large conical-necked vessel (*Kegelhalsgefäß*). (Pl. 58B, 4)
- 13) Various small sherds, some carrying red or black paint. Two sherds are decorated: (i) with incised linear decoration and circular punches; the inside and outside of the neck and the outside of the shoulder is painted black (Pl. 58B, 2), (ii) with linear grooved decoration; the grooves are filled with red paint and the outside and shoulder are graphited (Pl. 58B, 1).

Museum: Römisches Museum, Augsburg (inv. nos 716,1–45).

104 Bad Königshofen i. Grabfeld – Merkershausen, tumulus of 1897

(Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)

References: Anon. 1882, 131f.; Benninger 1956, pl. 35, 2; Behrends 1972, 1–30.

Description: This grave was found in 1879 in the remains of a ploughed-out tumulus, as a farmer was clearing away the stones of the stone packing. According to the farmer unburnt bones were found, as well as in-urned cremations. This group of finds is not absolutely securely associated, but very probably constitutes a closed find.

Finds:

- 1) One fragment of an iron tyre, width ca. 25 mm, with a cross-section of type IV. The nail shank preserves horizontal wood grain. The nail head does not project above the level of the tyre (type G). (Pl. 60B, 1)
- 2) Remains of eight or nine ribbed bronze neck-rings. (Behrends 1972, 10–11, figs 8–9)
- 3) Two bronze sheet 'Melon' arm-bands. (ibid. 13, fig. 10, 1–2)
- 4) Seven (of originally 13) bronze ankle-rings (*Schaukelringe*) with 'D'-shaped cross-section. (ibid. 14, fig. 11)
- 5) 10 conical bronze knobs with a bar on the rear side. (ibid. 13, fig. 10, 4–13)
- 6) Nine 'spectacle-shaped double spirals of bronze wire'. Lost.
- 7) Large fragments of thin bronze sheet with concentric circle decoration arranged in rows, apparently from a bronze belt sheet. Lost. Benninger also notes three rivets, each with a hollow boss, 13 mm in diameter, which could have belonged to a bronze belt sheet. (Pl. 60B, 2)
- 8) Pottery sherds.

Museum: Mainfränkisches Museum, Würzburg (inv. nos H 303–308.748.3251); Sammlung des Anthropologischen Vereins, Coburg (inv. no. H 49); Stiftsmuseum, Aschaffenburg (inv. nos 66–68.71).

105 Beilngries, 'Im Ried-Ost', grave 128

(Kreis Eichstätt, Reg.-Bez. Oberbayern)

References: Torbrügge 1965, 65.

Description: Excavations in 1908 brought to light stone packing

measuring 10 × 5 m, which covered a central grave. Torbrügge suggests an upper secondary grave and a lower primary grave. The secondary grave contained 'numerous sherds'. The primary grave lay under the stone packing and was not completely excavated. In the NW quarter of the primary grave were parts of a wheel and iron fittings, on the E side were found two bowls with animal bones.

Comments: Torbrügge suggests that some of the iron fittings purported to be from this grave may really be from Beilngries, 'Im Ried-West', grave 74. The inventory book in the Prähistorische Staatssammlung, Munich, includes a nave fragment from Beilngries, 'Im Ried-Ost', with uncertain provenance (Pl. 61, 3). As grave 128 was the only grave in the cemetery 'Im Ried-Ost' reported to contain wagon parts, it seems likely that the fragment came from this grave, particularly because it seems to fit with the nave-cap fragment from this wagon (Pl. 61, 6).

Finds:

- 1) Fragments of iron tyres, trapezoidal in cross-section, with a width of 15–16 mm and a height of 11.2 mm. The tyres were fastened by small-headed nails, which were hammered in every 110–190 mm. The nails preserve traces of diagonal wood grain. At one point, there must have been a joint between two of the nails, and worn areas of the tyre itself may suggest where the felloe-clamps were attached (Pl. 61, 1). One of the tyre fragments allows an external diameter of 800 mm to be estimated for the wheels. (Pl. 61, 1–2)
- 2) 13 tyre nails are also preserved, including one nail showing a penetration of at least 64 mm (Pl. 61, 4). Two nails preserve important traces of wood grain, in which a joint is to be seen 37 mm from the bent ends of the nails. This shows that the inner felloe was ca. 37 mm high. (Pl. 61, 4–5)
- 3) 18 fragments of iron felloe-clamps, made from bent iron bands ca. 43–46 mm wide, fastened at their ends by a pair of nails. Some fragments have traces of wood grain showing joints between inner (horizontal grain) and outer (diagonal grain) felloe parts. (Pl. 61, 7–8.11–13)
- 4) 32 fragments of a different type of felloe-clamp, composed of two iron bands 22–26 mm wide, one end of which is pointed. The clamps were held together by two iron rivets. One clamp is fully preserved (Pl. 61, 10) and allows a reconstruction of the felloe cross-section. Another fragment (Pl. 61, 9) has a nail hole and shows a joint between the (diagonal) grain of the outer felloe, and the (horizontal) grain of the inner felloe. By a combination of the constructional details of these two felloe-clamps it is possible to calculate that the outer felloe was 50–54 mm high. It has already been noted that the inner felloe was ca. 37.5 mm high (judging from nail fragments, Pl. 61, 4–5). It can therefore be shown that the felloe had a total height of about 90 mm. (Pl. 61, 9–10)
- 5) Fragment of an iron fitting from a nave-cap, with a thickened outer rim (external diameter ca. 96 mm) and an in-turned internal axle-channel (internal diameter ca. 44 mm). Two nails are preserved. This fragment seems to fit with the conical ribbed nave fitting to form a type Breitenbronn nave-cap made in two parts. (Pl. 61, 3.6)
- 6) Three small bronze 'pin' fragments. (Torbrügge 1965, pl. 27, 1–3)
- 7) Pottery stepped bowl (*Stufenschale*). (ibid. pl. 27, 6)
- 8) Pottery bowl. Lost.

Museum: Prähistorische Staatssammlung, München (inv. nos 1920, 169.263.321.322.1052.1055).

106A Beilngries, 'Im Ried-West', grave 73

(Kreis Eichstätt, Reg.-Bez. Oberbayern)

References: Torbrügge 1965, 83–85.

Description: No report is available for the excavation of this grave, in 1902, but it was mentioned by the excavator in a letter. The grave consisted of a stone construction with a large charcoal layer to the W. The tyre fragments lay in the burnt layer and among them were the two horse bits. The other objects were also found in the burnt layer. The tyre fragments were apparently sent to the museum in Munich, but Torbrügge reports that they had already been lost by 1912.

Comments: It may be that these tyre fragments became mixed with those from Beilngries, 'Im Ried-West', grave 74, under inv. no. 1920, 1053. The excavator stated that the tyre fragments from grave 73 measured 180–200 mm in length, which would exclude the majority of tyre fragments under inv. no. 1053, which include fragments up to 368 mm in length. However, about 5–7 relatively short fragments have a more rounded cross-section and may have come from grave 73 (e.g. Pl. 62, 5).

Finds:

- 1) Fragments of iron tyres, according to the excavator 180–200 mm long. Possibly represented by 5–7 fragments of tyres with shallow curved cross-section included under inv. no. 1920, 1053. Width ca. 26 mm. The nails have small heads; one nail survives with a penetration of 54 mm. (Pl. 62, 5)
- 2) Two iron horse bits. (Torbrügge 1965, pl. 34, 1.2)
- 3) Three or four fragmentary bone handle-shaped objects. (ibid. pl. 34, 3–5)
- 4) 20 bronze pendants. (ibid. pl. 34, 6–25)
- 5) Five iron pendants. (ibid. pl. 34, 32–36)
- 6) Two iron spectacle fibulae. (ibid. pl. 34, 28–31)
- 7) Five brown spherical pottery rattles. Two lost. (ibid. pl. 34, 26, 27, 37)
- 8) Pottery stepped bowl (*Stufenschale*). (ibid. pl. 34, 39)
- 9) Pottery bowl. (ibid. pl. 34, 40)
- 10) Pottery cup. (ibid. pl. 34, 38)
- 11) Sherds of a pottery bowl.

Museum: Prähistorische Staatssammlung, München (inv. nos 1920, 348.534–542.1053?).

106B Beilngries, 'Im Ried-West', grave 74

(Kreis Eichstätt, Reg.-Bez. Oberbayern)

References: Torbrügge 1965, 85–86.

Description: The excavation, in 1900, uncovered a stone packing measuring 7 × 7.5 m. Roughly in the middle (presumably under the stone packing) lay the thigh bones of a human skeleton, orientated with the feet to the N. SW of the bones were the remains of a wheel and nave-sheathings, several small bronze pins with triangular heads, some small bronze objects, various iron fragments, and an 'iron dagger without hilt-tang'. W of the left foot stood two fire-dogs and some spits. 'Rather to the side' was a large quantity of bones which, according to a hoof-bone fragment, belonged to a horse. Among the bones were some sherds. Around the bones were components of horse-gear. The pottery was positioned in the NE and E parts of the grave; also in this part of the grave were some animal bones – pig bones according to the excavator.

Comments: The total length of these tyre fragments adds up to ca. 9.7 m, which would correspond to four wheels with a

diameter of about 772 mm. This would presuppose careful collection of the fragments, which is hardly to be expected from this excavator. Therefore, it is possible either that the wheels had a larger diameter, or that tyre fragments of the same type from other graves are mixed under this inventory number (inv. no. 1920, 1053). The tyre fragments themselves allow an estimated diameter of 900–950 mm which is, however, made rather unreliable owing to their poor preservation.

The 'iron dagger without hilt tang, with bronze rivets' was not mentioned in the inventory of the museum in Munich, and it may not have been delivered by the excavator. Torbrügge suggests that the excavator had mistaken another object for a weapon, but it is difficult to put forward a possible candidate.

Finds:

- 1) 67–69 fragments of iron tyres with a type II cross-section; the maximum length of a fragment is 368 mm and the total length of the fragments is ca. 9.7 m. Width 20–24.5 mm. The tyres were fixed by nails hammered in every 80–130 mm which had small, roughly rectangular type B heads (measuring ca. 5–10 × 9–25 mm, size variation probably owing mainly to corrosion). The longest nail penetration measured was 51 mm. On one nail (Pl. 62, 4), the join between the outer and inner felloe layers is visible, showing that the outer plank felloe was 42 mm high. The tyre nails frequently display remains of diagonal wood grain and in two cases this is combined with traces of a join between felloe segments on the inside of the tyre (Pl. 62, 4.9). The angle of the wood grain to the tyre, at the point of the join of the felloe segments, measured 43° and 47°. This leads to an estimate of four external felloe segments. In one case, imprints of two spokes seem to be preserved on the inside of the tyre (Pl. 62, 10). According to the distance between the spokes, and the estimated diameter of 900–950 mm, it is found that 10 spokes were probably used on the wheel. (Pl. 62, 1.4.8–10)
- 2) Three tyre nail fragments. One fragment (Pl. 62, 7) consists of the end of a nail with horizontal wood grain. The end of the nail has been bent over and must conform to the rounded shape of the felloe. (Pl. 62, 6.7)
- 3) 12 fragments of felloe-clamps. These were originally roughly 50–60 mm wide at the top (near the tyre), where they were secured by two pairs of nails, and about 38–40 mm wide at the bottom (at the inside of the felloe). A combination of the profiles of the felloe-clamp fragments allows a reconstruction with a height of about 61 mm and a maximum internal width of about 34 mm. The felloe-clamps bear horizontal and diagonal wood grain. (Pl. 62, 11–13)
- 4) 79 small fragments of iron sheet: parts of felloe-clamps or nave-sheathing.
- 5) 22 fragments of nave-neck sheathing, roughly 62–66 mm wide. One fragment shows a join, which is held together by two nails. (Pl. 62, 2.3)
- 6) 30 fragments of iron nave-head fittings of type Breitenbronn, comprising nave-head rings and nave-caps. The diameter of the nave-head ring is ca. 108–112 mm. The axle-channel has an internal diameter of ca. 34–38 mm. (Pl. 62, 3)
- 7) Associated finds include: 13 small pins with triangular heads; four very small plaques of bronze sheet and further fragments; 'a few bronze bosses and rings'; an 'iron dagger without hilt-tang, with bronze rivets' (not in museum inventory); two iron fire-dogs; about 14 iron spits; horse-bones; two iron horse bits; four bronze cheek-pieces; six

small bronze toggles; nine bronze rings with square cross-section; one bronze ring with round cross-section; 10 bronze rein ornaments; eight 'Jochschnallen', one of which originally with leather remains; 313 small bronze bosses with loops on their rear sides; 62 larger bronze bosses with clips at the back; 53 very small bronze bosses with small pins at the back; 95 very small bronze bosses with long clips at the back; one very small bronze ring and some fragments; six pottery vessels; sherds. (Fuller list and illustrations in Torbrügge 1965, 85–86 and pls 27, 8–14; 28; 30–33).

Museum: Prähistorische Staatssammlung, München (inv. nos 1920, 501–530.1053.1159–1161).

106C Beilngries, 'Im Ried-West', grave 89

(Kreis Eichstätt, Reg.-Bez. Oberbayern)

References: Torbrügge 1965, 88–89.

Description: A stone packing was uncovered in the course of excavations in 1912. In the NW quarter of the grave was a skeleton, orientated with its skull to the S. Alongside the left leg lay an iron sword with the tip pointing to the S. S of the skull stood three pottery vessels; nearby were a horse bit, numerous rings and two or three iron nails with disc-shaped heads. Towards the W were remains of tyres, iron fittings, the second horse bit, three further iron nails with disc-shaped heads, a large iron ring with iron pendants and a pottery ring. In the E part of the grave were three further pottery vessels.

Comments: The vehicle parts from this grave are lost. Concerning the tyres, some of the tyres under inv. no. 1920, 1053 could belong to this grave. As for the nave fittings, it is not possible to assign any of the finds to this grave (see also cat. nos 106A and 106B).

Finds:

- 1) Fragments of iron tyres. Lost.
- 2) Iron nave fittings. Lost.
- 3) Associated finds include: one iron sword; two iron horse bits; six iron rings; six iron nails with disc-shaped heads; a large iron ring with iron pendants; a fragmentary small iron rod; looped iron rod-pendants; fragment of a pottery ring; six vessels; sherds. A spherical pottery rattle, a pottery spindle-whorl and a perforated pottery disc may also be associated. (A fuller list and illustrations in Torbrügge 1965, 88–89 and pl. 35)

Museum: Prähistorische Staatssammlung, München (inv. nos 1920, 257.262.781–793.1238).

107A No grave allocated.

107B Beratzhausen, grave 3

(Kreis Regensburg, Reg.-Bez. Oberpfalz)

References: Weber 1895b, 302–303; Kossack 1954a, 152–3; Torbrügge 1979, 286–287.

Description: These finds were acquired by J. Naue and probably originated from uncontrolled excavations. No report of the discovery is available, although Weber listed the finds in 1895. The finds were entered in the inventory of the museum in Munich in 1894.

Finds:

- 1) 58 fragments of iron tyres of type Ia, width 20–22 mm. A

groove is provided on the outside of the tyres for the long nail heads of the tyre nails (type A). The nails are fitted so closely that the nail heads almost touch each other. The nails frequently have traces of diagonal wood grain; in one instance, a join between the inner and outer felloe rings is visible (Pl. 63, 31). The longest nail penetration is 56 mm. The diagonal wood grain on some of the nails extends to a penetration of 45 mm, showing that the outer felloe ring was at least 45 mm thick. An estimated diameter of 1.04 m was obtained from one large tyre fragment (Pl. 63, 30). (Pl. 63, 26–28.30–32)

- 2) Nine fragments of sheet bronze fittings, mostly from naves. Some fittings are of uncertain purpose. (Pl. 63, 1–2.5–6.9–10.18.24)
- 3) 12 fragments of bronze sheet, of irregular shapes. (Pl. 63, 11)
- 4) 249 fragments of sheet bronze strips, mostly with holes. In some cases small bronze nails hold several strips together. The strips are always curved and must have been fitted as decoration onto a rounded background. (Pl. 63, 13–17.19–23)
- 5) 11 fragments of iron pendants, probably from linchpins. One pendant (Pl. 63, 12) retains part of the linchpin in its loop. (Pl. 63, 3–4.7–8.12)
- 6) Numerous bronze ornaments belonging to wagon-box decoration of type ii (see Fig. 74, 11–20): openwork bronze plaques; 25 hemispherical nailed bronze bosses; 44 bronze rings with triangular cross-section, each provided with three nails; 55 bronze wheel-shaped plaques each fitted with a nail in the centre.
- 7) Associated finds include: iron sword; iron horse bit; four conical rein ornaments with a loop on the rear side; 12 small hollow bronze knobs with paired tongues; two rings with octagonal cross-section; fragment of bronze tweezers; small bronze rod; small bronze punch-shaped rod; spiral bronze ring; two bronze swan's neck pins; head of a bronze cup-headed pin; small bronze cross-shaped fragment; numerous sherds (fuller list and illustrations in Torbrügge 1979, 287 and pls 56; 57, 1–12.19–52; 58, 1–10).

Museum: Prähistorische Staatssammlung, München (inv. nos 1894, 172, 1–32).

108 Dietfurt a. d. Altmühl, 'Tennisplatz', grave 31

(Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)

References: Unpublished excavation report in the Bayerisches Landesamt für Denkmalpflege, Außenstelle Abensberg.

Description: Grave 31 was uncovered in 1982, in the course of the excavation of a cemetery containing 42 chamber graves under tumuli and 57 urn graves. No remains of the tumulus had survived, but it is likely that the grave had originally been covered by one. The excavators found a layer of stone packing measuring 6 × 6 m. In some places the stone packing over the grave had been disturbed; indeed a few iron rings, remains of an iron horse bit and some sherds were already found on the surface of the stone packing. After removal of the stone packing, the lay out of the grave was revealed (Fig. 180). In the SW part of the grave was a skeleton, orientated (head)S-N(feet). The skeleton was identified as male, about 40 years old (information from Dr H. Claassen, Coburg). To the E of the skeleton was an iron sword, with its hilt pointing to the S. To the S and SE of the skeleton were two iron horse bits and various iron fragments belonging to the harness. On the abdomen of the skeleton lay several iron rings, a fragment of an iron knife and a fragmentary

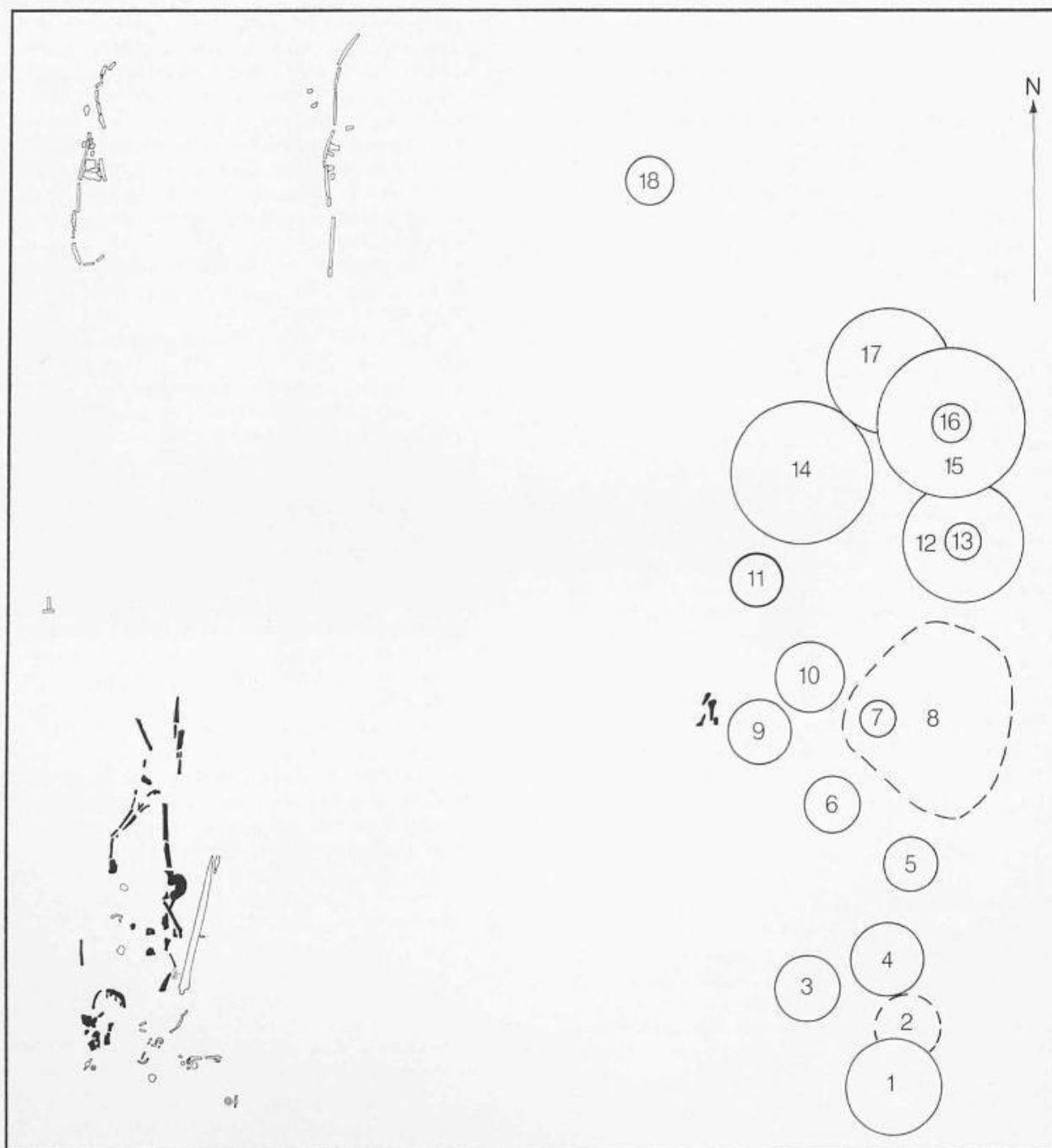


Fig. 180 Dietfurt a. d. Altmühl, 'Tennisplatz', grave 31: plan of the grave (bone is drawn in black, iron objects are drawn in outline).
— Scale 1:30.

piece of flat iron (Fig. 181). The E part of the grave was occupied by 18 or 19 pottery vessels. Slightly to the W of the vessels was a small collection of animal bones.

The NW quarter of the grave was occupied by the remains of a wheeled vehicle. The plan shows the iron remains of two wheels. Nevertheless, it is almost certain that the vehicle was originally a four-wheeler. The excavators left a baulk between the skeleton and the two surviving wheels – in order to draw the profile of the grave. When the profile was removed, numerous iron fragments were collected and bagged with the provenance 'aus dem Steg'. A rough sketch shows that they were found in two main concentrations, coinciding exactly with the position

one would expect for the two front wheels of a four-wheeled wagon.

Comments: According to information from Dr. M. Hoppe, wagon fittings also came to light in other graves from Dietfurt (graves 38 and 87). The cemetery will be published in the near future by Dr. K.-H. Röhrig.

Finds:

- 1) At least 50 fragments of iron tyres, width 20–26 mm. The tyres (type Ib) had a groove on their outer side to accommodate the tyre nail heads which were long (type A), ranging in length from 25–45 mm. The height of the felloe

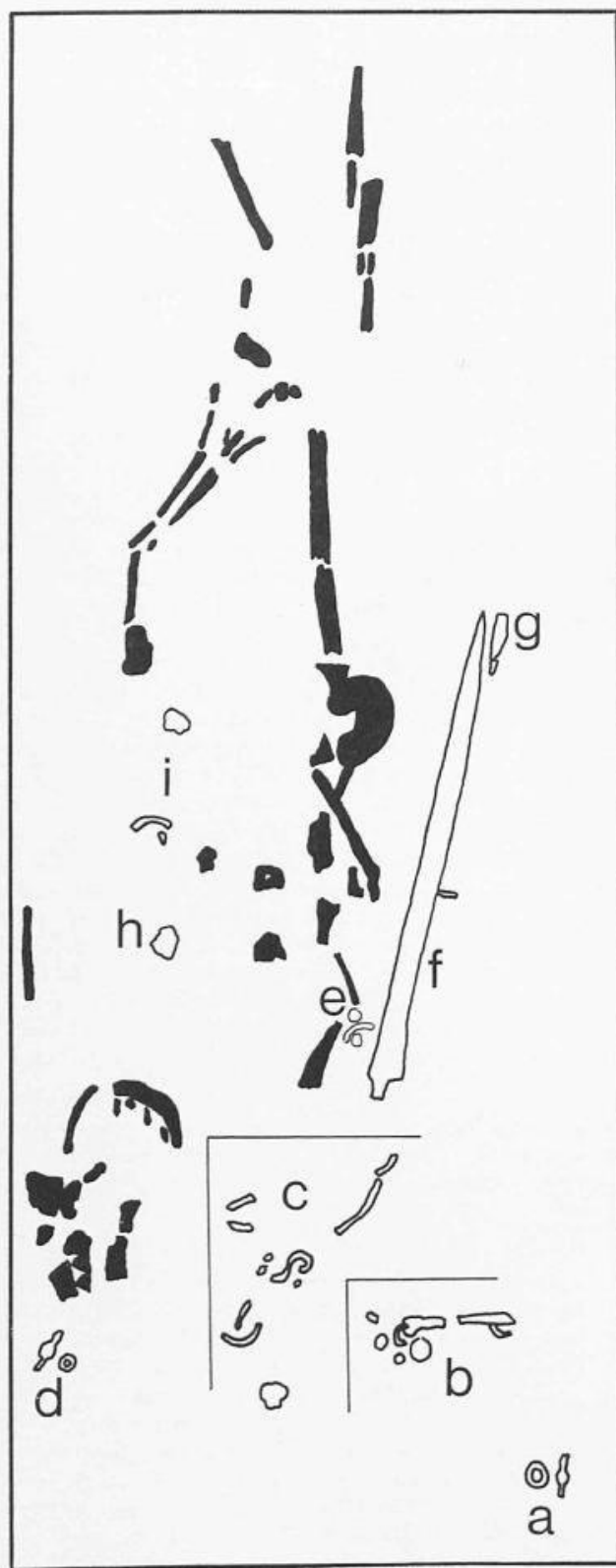


Fig. 181 Dietfurt a. d. Altmühl, 'Tennisplatz', grave 31: detail of Fig 180: a – iron toggle and iron ring (Pl. 65, 2.7); b – iron bit, omega-clip, three profiled discs (Pl. 65, 8.15–17.19); c – iron omega-clip, fragments of horse bit, iron rings and iron sheet (Pl. 65, 9–10.18); d – iron toggle, two iron rings (Pl. 65, 4.11.12); e – one sherd, two fragments of iron rings, one piece of iron sheet (Pl. 65, 3); f – iron sword (Pl. 64, 1); g – iron knife fragment (Pl. 65, 13); h – eight fragments of iron rings (Pl. 65, 6); i – 'T'-shaped fragment of iron, fragment of iron knife, three iron ring fragments (Pl. 65, 14.20). – Scale 1:10.

is shown by one fully-preserved nail to be 69 mm (Pl. 64, 7). In every case where wood grain was preserved on the tyre nails, it was found to run in a horizontal direction. The nails were not hammered in very close together; the shortest distance measured between two nails was 123 mm. (Pls 64, 2–9.11; 65, 1)

- 2) Fragments of iron sheet from nave-neck sheathings. The fragments carry longitudinal wood grain on their concave sides. The rim of one end was everted, the other end was straight. (Pl. 64, 20–22)
- 3) 13 fragments of iron nave-head rings. The sides of the iron fragments have zig-zag toothed decoration. (Pl. 64, 15–19)
- 4) Nine fragments of iron sheet from felloe-clamps. One fragment (Pl. 64, 12) shows that the felloe-clamps must have extended all round the felloe and touched the tyres, because its length corresponds to the height of the felloes (69 mm high). The felloe-clamp fragments sometimes carry traces of wood grain, which is horizontal in every case. (Pl. 64, 10.12–14)
- 5) Numerous fragments of iron sheet, from felloe-clamps or nave-neck sheathings.
- 6) Two fragments of an iron knife. (Pl. 65, 13–14)
- 7) Flat 'T'-shaped fragment of iron. (Pl. 65, 20)
- 8) Two iron toggles, thickened and with an opening in the middle. (Pl. 65, 7.11)
- 9) Fragments of two iron horse bits. In the end-rings of the bits were two iron rings, one large and one small. (Pl. 65, 8–10)
- 10) Three iron knobs with circular profiled decoration on their upper sides and iron rods with a thick square cross-section on their rear sides. These could originally have been joined to rings and may have been used on wooden cheek-pieces. (Pl. 65, 15–19)
- 11) At least five iron rings and 13 fragments of iron rings. The rings were probably all originally square in cross-section. Diameters 40, 33, and 28 mm. (Pl. 65, 2–6.12)
- 12) Iron sword, length 894 mm. The blade is lozenge-shaped in cross-section. Part of the hilt is broken off, but one rivet in the hilt can be seen, as well as a rivet just below the shoulder. (Pl. 64, 1)
- 13) Animal bones.
- 14) Vessel 1: large open dish with slightly everted rim, height 138 mm, rim diameter 440 mm. Fine clay, colour in and out dark brick-red to reddish brown. (Pl. 66, 5)
- 15) Vessel 2: several sherds from a vessel, but too few to be reconstructed.
- 16) Vessel 3: open dish with stepped internal profile, height 88 mm, rim diameter 302 mm. Decoration consists of double or triple runs of toothed wheels (*Rollrädchen*). The inside of the vessel is graphited. (Pl. 67, 7)
- 17) Vessel 4: lower part of a large vessel, maximum height preserved 185 mm, maximum diameter 342 mm. Black colour in and out. (Pl. 67, 6)
- 18) Vessel 5: jar-shaped vessel, height 225 mm, maximum diameter 244 mm. Coarse bright brick-red outer surface, at the bottom mottled with black streaks (from firing or use). The inside of the vessel is khaki-brown and smoother than the outside. The rim and shoulder bear pinched cordons. (Pl. 67, 3)
- 19) Vessel 6: spherical bowl with everted rim, height 130 mm, maximum diameter 242 mm. Both inside and out the surface is a creamy white colour (*weißtonige Keramik*). Decoration is black (black on illustration) and red (stippled on illustration); originally five pairs of hanging triangles. (Pl. 67, 2)
- 20) Vessel 7: small bowl with vertical rim, height 76 mm,

maximum diameter 142 mm. Dark leather brown colour in and out. Incised linear decoration: four groups of zig-zags divided by four groups of three triglyphs. Some of the grooves show traces of white filling. Possibly originally placed inside vessel 8. (Pl. 65, 22)

- 21) Vessel 8: sherds from one or two large vessels, too few to be reconstructed.
- 22) Vessel 9: bowl with vertical off-set rim, height 120 mm, maximum diameter 287 mm. The surface is brick-red to light brown in colour. The outside of the neck is graphited and the decorated zone carried dark red paint. Some of the stripes of the decorated zone may have been graphited, but this is not certain. (Pl. 67, 5)
- 23) Vessel 10: open dish with stepped internal profile, height 78 mm, rim diameter 314 mm. The inside is decorated with thin grooves and little circular impressions. Colour in and out brick-red/black. (Pl. 65, 21)
- 24) Vessel 11: large bowl with slightly off-set vertical rim and slightly omphaloid base, height 94 mm, maximum diameter 237 mm. Brick-red colour, neck graphited. Engraved decoration on belly of vessel. The decorated area also seems to have traces of graphite paint. (Pl. 67, 1)
- 25) Vessel 12: large conical-necked vessel (*Kegelhalsgefäß*), height 430 mm, maximum diameter 560 mm. Outside mottled brick-red/black/brown, inside leather brown. Double toothed wheel (*Rollrädchen*) decoration and circular stamps. (Pl. 67, 4)
- 26) Vessel 13: small bowl with slightly conical neck, height 76 mm, maximum diameter 135 mm. Incised decoration of zig-zags and triglyphs, sometimes showing traces of a white filling. Originally inside vessel 12. (Pl. 65, 24)
- 27) Vessel 14: large conical-necked vessel (*Kegelhalsgefäß*), height 515 mm, maximum diameter 650 mm. Decoration with double lines of toothed wheel tracks (*Rollrädchen*), and circular stamps. The outside is graphited above the belly. (Pl. 66, 3)
- 28) Vessel 15: large conical-necked vessel (*Kegelhalsgefäß*), height 511 mm, maximum diameter 676 mm. Decoration with double runs of toothed wheel (*Rollrädchen*) and hatched triangles executed with the toothed wheel. Circular stamps are also used. Upper part of the vessel (above widest point) graphited. (Pl. 66, 2)
- 29) Vessel 16: small conical-necked vessel with slightly omphaloid base, height 118 mm, maximum diameter 165 mm. Incised triangular and circular decoration. At the base of the neck are four grooves. Originally inside vessel 15. (Pl. 65, 23)
- 30) Vessel 17: large conical-necked vessel (*Kegelhalsgefäß*), undecorated, height 457 mm, maximum diameter 572 mm. Outside, above the widest point, graphited. (Pl. 66, 4)
- 31) Vessel 18: bowl with vertical neck, height 101 mm, maximum diameter 214 mm. Decoration of hanging triangles executed with the toothed wheel (*Rollrädchen*). Shoulder and neck graphited. (Pl. 66, 1)

Present location: Bayerisches Landesamt für Denkmalpflege, Abensberg.

109 Dillingen a. d. Donau-Kicklingen, 'Mittleres Ried', tumulus 9

(Kreis Dillingen a. d. Donau, Reg.-Bez. Schwaben)

References: Schaeble 1898, 183–187; Reinecke 1908, 117–132; Zenetti 1939, 28–29; Kossack 1959, 146–148.

Description: This is a large cemetery (84 tumuli), 16 tumuli of which were excavated by Schaeble. Tumulus 9 was excavated in 1898 and measured 54 paces in circumference and 1 m in height. The tumulus contained two central graves, one above the other; the secondary grave, 400 mm deep, contained the wheeled vehicle. The grave was marked by a 'burnt layer' (? possibly the remains of a wooden grave chamber), orientated ESE-WNW and measuring 5.5 × 1.5 m. The E part of the 'burnt layer' contained much charcoal (from oak wood) and burnt bones (possibly indicating that this was a double, biritual grave – including the inhumation described below). The W part of the 'burnt layer' was occupied by wagon remains, covering an area of 1 × 2.6 m. The wagon was apparently positioned W-E. The NE tyre was intact and had a diameter of 750 mm; some of the tyres preserved wooden remains from the felloe, which was made of ash. According to the excavator, the tyres were riveted together, not welded. The nave of the SE wheel was well preserved, the nave-stock measuring 120 mm in length and each nave half measuring 170 mm in length (total length 460 mm). Schaeble stated that each axle was joined to the wagon body by two iron bands (but these could actually have been felloe-clamps, in which case each wheel would be provided with one clamp).

'In front of the wagon (i.e. to the E) were numerous iron knobs from horse-gear; further knobs were found at both sides of the wagon. In all there were at least 59 knobs. At the N side of the wagon were two iron rings, 35 mm in diameter. Among the horse-gear was a bronze 'punch', 38 mm long, the remains of a neck-ring 'made of bronze wire, semicircular in cross-section, with hooked ends', and two small rings (diameter 25 mm). Also in this area was an iron terminal with a hollow lens-shaped end.

Five pottery vessels were positioned to the E of the wagon (one containing pig bones), and a sixth vessel was found SW of the wagon. 1 m to the E of the SE wheel was a skeleton, orientated N-S (according to Kossack, the head was to the S, and the feet to the N). In the middle of its chest was a bronze fibula and at its hips was a plain bronze belt-sheet. At the right hand side of the skeleton was a long thin iron spearhead (length ca. 500 mm).

Comments: The inhumation could be a secondary burial, with the cremation being the original burial of the upper grave. There could also be some mixing with the lower grave, but there is no evidence of this.

Finds:

- 1) Remains of four iron tyres of type VII, width ca. 30 mm, diameter 750 mm. The tyres were fixed with irregularly-spaced nails (distance between nails 82–123 mm, and occasionally more), with thin shanks (the longest surviving penetration is 53 mm, but apparently originally preserved to a length of 50–60 mm), and large squarish heads of type F (ca. 17 × 17 mm, but sometimes of irregular shape and as much as 30 mm long). The nail shanks preserved exclusively horizontal wood. (Pl. 68A, 2)
- 2) Remains of four well-preserved sets of iron nave fittings of type Kicklingen. The naves were originally 460 mm long, of which the nave-stock was 120 mm in length, and each nave half was 170 mm long. Each half of the nave is composed of a bevelled ring marking the side of the nave-stock, four iron hoops on the nave-neck and a nave-cap, providing an axle-channel 56 mm in diameter. (Pl. 68A, 1)
- 3) Four iron bands ('to hold the axles to the wagon body'); probably felloe-clamps, thus one for each wheel. Lost. (Kossack 1959, pl. 39, 29)
- 4) Iron terminal with curved, slightly tapering socket (the opening is ca. 13 mm in diameter) and a hollow lens-shaped

- knob. Between the knob and the socket are two small iron rings (diameter ca. 9 mm). (Pl. 68A, 3)
- 5) At least 59 iron rein-knobs, of six different types:
 - i) about 38 small knobs with a conical, stepped profile, provided with a straight bar on the rear side (diameter 23 mm).
 - ii) five round knobs, ca. 33 mm in diameter, with a central hemispherical knob, a broad flange and a straight bar on the rear side. (Pl. 68A, 11)
 - iii) seven round knobs, diameter ca. 33 mm, with a conical, stepped profile and a single band on the rear side. (Pl. 68A, 10)
 - iv) one knob like iii, but with a diameter of 45 mm and with a double band on the rear side.
 - v) seven round knobs with a central hemispherical knob and a flange with one step, diameter 54 mm, with a double band on the rear side. (Pl. 68A, 9)
 - vi) three fragments of at least two larger round knobs with a conical, stepped profile, diameter ca. 80 mm.
 - 6) Two iron rings, diameter 35 mm.
 - 7) Two iron rings, diameter 25 mm.
 - 8) One bronze 'punch', length 38 mm. Lost.
 - 9) Remains of a bronze wire neck-ring, semicircular in cross-section, with hooked ends. (Kossack 1959, pl. 39, 17)
 - 10) Bronze fibula with pointed drum and crossbow construction. (ibid. pl. 39, 18)
 - 11) Bronze belt sheet, undecorated. (ibid. pl. 39, 30)
 - 12) Long thin iron spearhead, length ca. 500 mm. (ibid. pl. 39, 28)
 - 13) Six pottery vessels, two of which are published, the rest are lost. (ibid. pl. 39, 31; Reinecke 1908, 121, fig. f)

Museum: Stadt- und Hochstiftsmuseum, Dillingen an der Donau (inv. nos 4394, 4399, 4400–4402 and 4404).

110 Dittenheim

(Kreis Weißenburg-Gunzenhausen, Reg.-Bez. Mittelfranken)

References: Eidam 1889, 44–51. Unpublished manuscript by H. Eidam, dated ca. 1922, in the Stadtmuseum, Gunzenhausen ('Inventar des Museums Gunzenhausen').

Description: The largest in a group of 16 tumuli was excavated by Eidam in 1881 (height 1.25 m, diameter 40 paces). Excavations began by digging a trench from the E towards the centre of the tumulus. A few iron fragments were found near the centre, and the trench was enlarged there to form a large circular area. Towards the N a few human bones and a decorated pottery vessel were found, and close by was a complicated arrangement of iron fragments. The iron fragments belonged to a wagon and were distributed within a circular area of roughly 2 m diameter. The situation of the finds is shown on Fig. 182. Eidam described the finds thus:

'Die Eisenstücke, aus denen die durcheinander laufenden Stränge gebildet wurden, waren oft von beträchtlicher Dicke (bis zu 7 cm) und natürlich sehr stark verrostet, auch mit der vom Rost gefärbten schmierigen Erde fest verbunden. An manchen Stellen waren sie mit theilweise ganz gut erhaltenem Holz bedeckt, und lagen oft zu 3 Schichten übereinander in einer Höhe bis zu 20 cm. An mehreren Stellen zeigten sich Bronzeblättchen und Bronzebeschläge auf den Eisen- und Holzstücken. Zwei grosse Bögen, welche nach Norden und Westen hin convex lagen, gehören wohl den Überresten von Radreifen und Radfelgen an. Der mit 'a' bezeichnete Theil stand aufrecht und setzte sich nach oben in einen eisernen Ring fort, doch stellte sich später bei genauerer Untersuchung heraus,

daß diese zwei Theile gar nicht zusammengehörten, sondern nur durch den Druck so dicht zusammengepresst worden waren; die zwei schraffierten Stellen ('b', 'b') sind ganz aus Holz und bildete die letztere einen nach oben aufrecht stehenden Bogen. Ebenso ist die ganze mit 'c' bezeichnete Masse von Holz und ist der mit 'd' bezeichnete gekrümmte Fortsatz ebenfalls nach oben zu denken. Nur die mit einigen scheinbaren Ringen versehene Krümmung bei 'e' ist von Eisen und lag halb unter der grossen vielfach durchbrochenen Holzmasse' (Eidam 1889, 45).

Apart from the pottery vessel first found by the excavator (Fig. 182, f), another was found to the W (Fig. 182, g). Otherwise there were no sherds, and no signs of charcoal or a burnt layer.

The ring-shaped object (Fig. 182, a) turned out on cleaning to be a metal-clad nave (Eidam 1889, pl. 7, 2). According to Eidam's description, the nave-head was covered with iron sheathing, and the nave-neck with bronze sheathing. According to Eidam, the axle-channel of the nave was also lined with iron sheet. Inspection of the surviving nave remains shows that the nave-necks were indeed sheathed with bronze and iron sheet; but there is no evidence to show that the axle-channels were lined with iron sheet. Eidam described the wheels as having four spokes (ca. 240 mm long) and a diameter of ca. 660 mm. The spokes were apparently oval in cross-section and tapered towards the felloes. The whole length of the spokes was sheathed in bronze, as were the felloes, at least on their outer sides. Eidam also described various decorative metal plaques of bronze and iron (1889, pl. 7, 3), which slotted into iron fittings (1889, pl. 8, 2). During cleaning of the finds, Eidam also noted various iron ring-shaped objects, some with triangular pendants (1889, pl. 8, 3.4). Detailed study shows that they are fragments of linchpins.

Comments: The paucity of pottery vessels and the lack of horse-gear and other finds lead to the suspicion that only part of the grave goods was uncovered. Eidam's plan of the grave floor is very difficult to interpret and does not necessarily seem to indicate a two-wheeled vehicle, as Eidam thought. Eidam's measurements for the diameter of the wheels, and the length of the spokes, must be dismissed as unreliable; on the other hand, some tyre fragments have been reconstructed on a wheel of diameter 625 mm and fit quite well – resulting in a diameter of ca. 660 mm. His report that the spokes and felloes were covered with bronze sheet is of importance.

Note that these grave finds have recently been published by M. Hoppe (1986).

Finds:

- 1) 35 fragments of iron tyres, width ca. 25–28 mm. These fragments were badly burnt in a modern accident and the original shape is difficult to distinguish. However, the cross-section seems to be of type II; the shape of the nail-heads cannot be distinguished, but they may have been large and sub-rectangular (type C?). (Pl. 69, 4.6–7.9–10)
- 2) Fragments from at least two nave halves, consisting of ribbed iron nave-caps, iron nave-head rings and bronze and iron nave-neck sheathing. Some fragments of the nave-neck sheathing clearly show that the nave-neck was assembled from iron and bronze sheet bands. Only one fragment of bronze sheet survives from the nave-neck, and it seems to bear remains of two raised ribs (Pl. 69, 3). (Pl. 69, 3.5.8.22)
- 3) Seven thin iron strips, 28–32 mm wide. The bands carry transverse wood grain on one side, and appear to have been fastened by two nails. Judging by one fragment, they were originally at least 81 mm long. (Pl. 70A, 3–5)
- 4) 10 fragments of iron 'clamps'. Eight of the 'clamps' carry

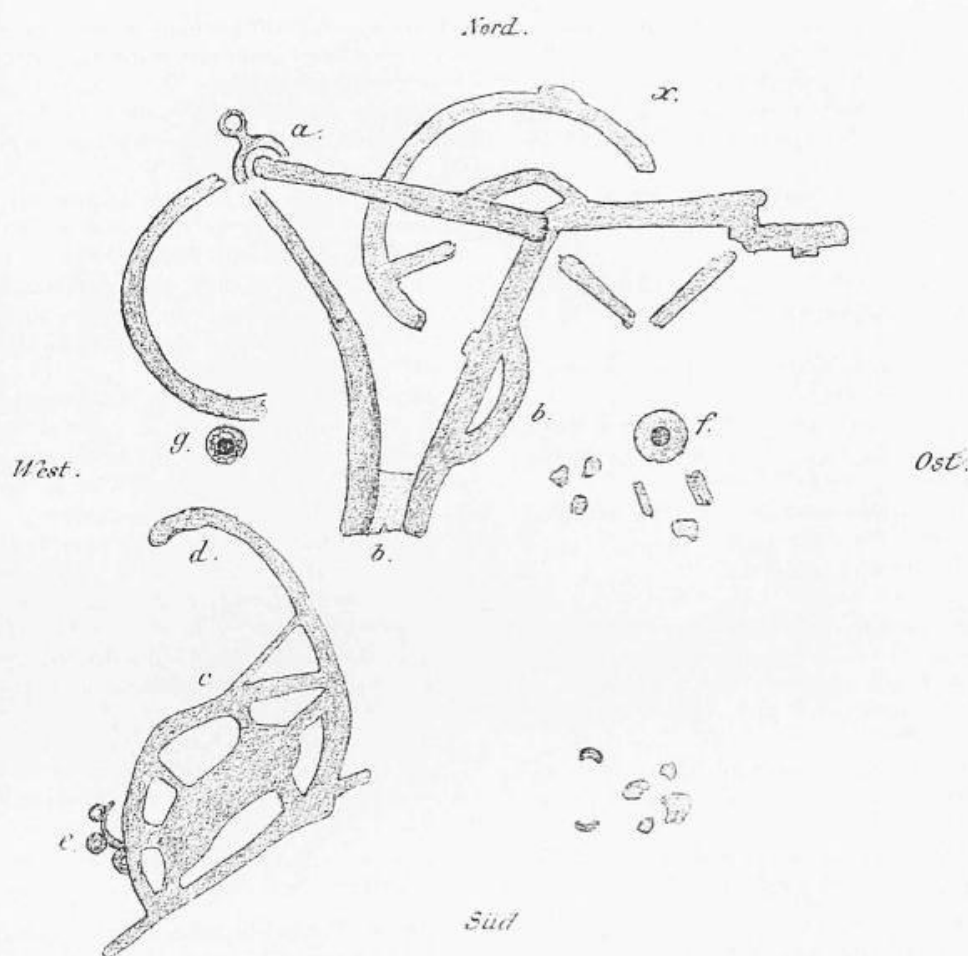


Fig. 182 Dittenheim, plan of the wagon-grave (after Eidam 1889). – Not to scale.

horizontal wood grain (Pl. 70A, 1–2). Two fragments show wood grain running in different directions, in one case apparently showing a complex joint (Pl. 70A, 6.10). Some of these fragments could be felloe-clamps, but others are too large or the wrong shape (especially Pl. 70A, 10). (Pl. 70A, 1–2.6.10)

- 5) Six fragmentary decorative plaques, made of bronze and iron. The long sides of the plaques are provided with bronze sleeves. The decorative element is formed from an iron framework with lozenge and triangle-shaped openings. In the lozenge-shaped openings are inserted bronze elements decorated with a round boss. The triangular openings were bordered with bronze sheet. The plaques measured 38–45 mm wide, and were originally about 87 mm long. (Pl. 68B)
- 6) 21 fragments of iron fittings with an angular cross-section. The width was probably originally enough to accommodate the bronze decorative plaques described above. The inner surfaces of these fragments carry longitudinal wood grain. The longest fragment measures 81 mm. (Pl. 70A, 7–9; see also Eidam 1889, pls 7, 3; 8, 2)
- 7) A large quantity of fragments of thin bronze sheet. These probably correspond to the bronze sheathings of the spokes, felloes and nave-necks, mentioned by Eidam. Most of the fragments are featureless. (Pl. 69, 20–21)
- 8) Various small bronze nails, which presumably functioned to fasten the bronze sheet described above. (Pl. 69, 23–24)
- 9) 15 fragments of large iron linchpins. The linchpins were

made of thick iron rods bent into shape, and triangular pendants. (Pl. 69, 11–19.25)

- 10) Remains of a pottery vessel, rim lost; height preserved 84 mm, maximum diameter 238 mm. Painted red in and out. The belly and shoulders carry incised decoration of hatched bands and triangles. (Pl. 70A, 11; Eidam's drawing shows an everted rim: Eidam 1889, pl. 2, 11)
- 11) Pottery vessel. Bowl-shaped with high slightly conical neck, height 150 mm, rim diameter 140 mm. The surface of the vessel was painted red, except for the neck which was shiny black. Along the shoulder runs a slightly sunken zig-zag black painted line. Lost. (Eidam 1889, pl. 2, 12)

Museum: Stadtmuseum, Gunzenhausen (inv. nos 721–812).

111 Donauwörth, 'Riegelholz', tumulus 10 (Kreis Donau-Ries, Reg.-Bez. Schwaben)

References: Krahe 1977, 37. Unpublished excavation report in the Bayerisches Landesamt für Denkmalpflege, Außenstelle Augsburg.

Description: This cemetery contains 12 tumuli. Tumulus 10 was excavated in 1971 and 1972 and measured 28 m (E-W) × 24 m (N-S) with a height of 1.60 m, which is the average size for the cemetery. The excavators found a stone packing measuring 3.80 × 3.80 m, under which was a dark soil discolouration

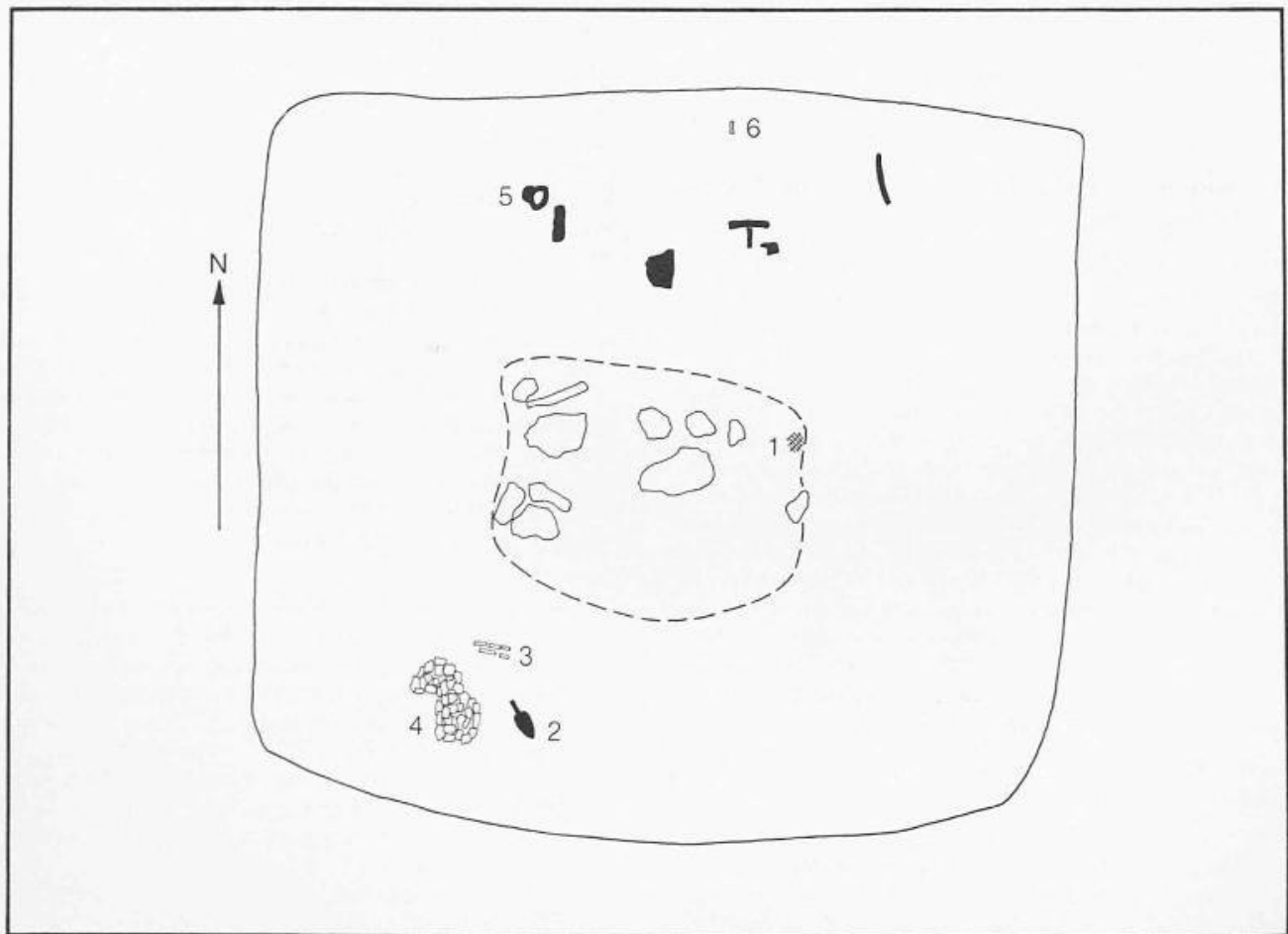


Fig. 183 Donauwörth, 'Riegelholz', tumulus 10: plan of the wagon-grave. — Scale 1:40.

measuring 3.90×4.20 m (Fig. 183). In the middle of this discoloured area was a darker patch of soil mixed with large stones, containing remains of cremated bone (Fig. 183, 1). In the SW corner of the large soil discolouration was an iron spearhead (Fig. 183, 2), N of which were a few bones (Fig. 183, 3). W of the spearhead were sherds of at least three pottery vessels of La Tène date (Fig. 183, 4). In the N part of the soil discolouration were various fragments of wagon fittings and horse-gear; these included an iron axle-cap (Fig. 183, 5), and a bronze fragment (Fig. 183, 6).

In 1972, excavations continued and 400 mm under the level of the soil discolouration of 1971 was found the primary grave chamber containing a cremation, 22 pottery vessels, an iron spearhead, and some animal bones.

Comments: The tumulus contained: (i) a primary cremation in a grave chamber (Ha C), (ii) a secondary (?cremation) burial in a rectangular grave chamber covered by a stone packing, provided with a wagon, and (iii) finally an inhumation burial deposited in a pit. The dark patch of soil mixed with large stones, in the middle of the grave chamber, probably represents disturbance of the wagon-grave, possibly by grave robbers.

Finds:

1) One tyre fragment, length 195 mm. The cross-section is of type VII and 34 mm wide. Two nails survive, one of which has a large flat head of irregular shape. The nails were set about 130 mm apart. Some wood is preserved on the nails,

and the grain runs in the same direction as the curve of the tyre. (Pl. 70B, 1)

- 2) One iron axle-cap of type Wellenburg, external diameter ca. 118 mm, internal diameter 51 mm. The axle-cap has a linchpin with a small globular head. (Fig. 183, 5; Pl. 70B, 7)
- 3) Fragment of iron with an 'L'-shaped profile. The outer edge of the fragment is curved and the fragment probably came from a nave-cap. (Pl. 70B, 6)
- 4) One curved piece of iron sheet, preserved to a length of 59 mm. Wood grain is preserved on its inner side, running in the same direction as the long axis of the fragment. Probably part of the nave sheathing. (Pl. 70B, 8)
- 5) One fragment of iron sheet with an 'L'-shaped profile, bearing one raised rib. The curvature of the fragment suggests that it may have been part of the nave sheathing. (Pl. 70B, 5)
- 6) Numerous small fragments of iron sheet, some of which have ribbed decoration. (Pl. 70B, 2-3)
- 7) Fragment of flat iron sheet on which sits a hollow hemispherical button pierced by an iron rivet with spherical head. (Pl. 70B, 9)
- 8) Two fragments of iron sheet, curved in profile (felloe-clamps?). One has a rounded end pierced by a nail. (Pl. 70B, 4)
- 9) 'Bronzeriemenzunge wohl vom Pferdegeschirr'. Lost. (Fig. 183, 6)
- 10) Iron spearhead. (Fig. 183, 2)

- 11) Sherds from at least three pottery vessels of La Tène date. (Fig. 183, 4)

Present location: Bayerisches Landesamt für Bodendenkmalpflege, Augsburg (inv. nos 20574, 20576, 20578–20581).

112A Ehingen a. Ries-Belzheim, 'Mähder', tumulus 104
(Kreis Donau-Ries, Reg.-Bez. Schwaben)

References: Hübener 1958, 159–162; 'OTTO' 1958, 11–13.

Description: One of the largest tumuli (or even the largest) in a cemetery of nearly 200 tumuli was excavated by Hübener in 1957. The tumulus had partly been disturbed by the landowner, but originally had a diameter of at least 34 m and a height of at least 2.2 m. The finds probably represent a central grave chamber, although no traces of the wooden chamber survived (for plans see Hübener 1958, 160, fig. 14; 'OTTO' 1958, 13). The E side of the chamber is marked by a row of 16 or 17 pottery vessels, orientated NNE-SSW, indicating a length of at least 3.5 m for this side of the chamber. Another vessel was found several metres to the W, but this was 300 mm above the level of the central grave and may indicate a secondary grave. The W half of the grave chamber was occupied by iron fragments from (?) horse-gear and from a wagon. Between the iron fragments and the row of vessels were found the cremated remains of the burial.

Comments: The W side of the grave chamber appears to have been disturbed, perhaps by older excavations.

Finds:

- 1) Five fragments of iron nave sheathing of type Breitenbronn, consisting of parts of the nave-neck sheathing, the nave-head ring (diameter ca. 120 mm) and the conical, ribbed nave-cap. (Pl. 71A, 1–2)
- 2) Five fragments of iron felloe-clamps. The felloe-clamps were wide at the top and tapered to a width of ca. 32 mm at the bottom (Pl. 71A, 15). Some of the fragments have traces of horizontal wood grain (Pl. 71A, 4–6.13.15)
- 3) Fragments of iron tyres, 21 mm wide, with type III cross-section, and slightly protruding sides. (Pl. 71A, 3)
- 4) Two iron fragments, possibly from a linchpin. The large iron rod (Pl. 71A, 7) is much larger than the tyre nails. (Pl. 71A, 7–8)
- 5) Fragments of joined iron rings. One fragment (Pl. 71A, 12) has two fragmentary bronze rings with square cross-section, another (Pl. 71A, 11) bears traces of corroded bronze on its shaft. (Pl. 71A, 9–12)
- 6) Iron terminal in the shape of a champagne cork. The terminal was fixed by an iron rivet. (Pl. 71A, 14)
- 7) Various uncharacteristic iron fragments.
- 8) Remains of a 'bronze spiral'. Lost.
- 9) 16 or 17 pottery vessels. (Hübener 1958, 161, fig. 16)

Museum: Römisches Museum, Augsburg (inv. nos VF 1957, 15–25).

112B Ehingen a. Ries – Belzheim, 'Mähder', tumulus 109
(Kreis Donau-Ries, Reg.-Bez. Schwaben)

References: Hübener 1958, 159–162. Unpublished excavation report in the Bayerisches Landesamt für Bodendenkmalpflege, Augsburg.

Description: A grave chamber was uncovered 800 mm under the present day ground surface; according to the plan of the

cemetery published by Hübener (1958, 159, fig. 13), this was one of the larger tumuli of the cemetery. Traces of the wooden sides of the chamber were visible on the N, E and S sides and, considering the slight discolouration of the soil inside the chamber, a size of 3.5 m (N-S) × 2.9 m (W-E) can be reconstructed. The chamber was orientated roughly NNW-SSE, and the NE corner was rounded rather than square. Traces of wood were also found inside the chamber, particularly remains of planks in the W half (possibly from the wagon) and a plank on top of a sherd group in the E half of the chamber (presumably from the roof of the grave chamber). In the W half of the chamber were numerous iron fragments, mostly from the wagon. The group of iron fragments furthest to the SW consists of almost 30 fragments of iron rings and iron 'omega-clips' from cheek-pieces – which constitute all that remains of the horse harnessing. As for the pottery, only three vessels were discovered complete. The rest of the pottery was removed by disturbance in the SE corner of the chamber, but enough sherds survived to show that at least five further vessels were originally present. No traces of the burial were found.

Finds:

- 1) 83 fragments of iron tyres and tyre nails. The tyres had a type IV cross-section and measure 24–28 mm in width. Very little wood grain is preserved, but it always runs in a horizontal direction. The tyre fragments are very badly corroded, but it seems that the nail heads were relatively large. (Pl. 71B, 1–9)
- 2) At least 16 fragments of nave-head rings, with a width of 16–20 mm, and an angular profile. (Pl. 71B, 12–15)
- 3) Two iron rings and 26 fragments of iron rings. The rings are square in cross-section. (Pl. 71B, 10)
- 4) Two iron 'omega-clips' from a wooden cheek-piece, both of which originally held iron rings. The clips preserve traces of wood on their shanks. (Pl. 71B, 11.16)
- 5) Various uncharacteristic iron fragments.
- 6) Two small conical-necked vessels (*Kegelhalsgefäße*). The outside of the neck is graphited. The rest of the outside of the vessel is painted cherry-red. On the shoulder are graphite-painted 'V'-shaped motifs placed one inside the other. The inside of the rim is painted red.
- 7) Small open bowl with 'S'-shaped profile and omphalos. The fabric is leather brown, and the vessel was graphite-painted inside and out.
- 8) Very small sherds from at least (?) five further vessels.

Present location: Bayerisches Landesamt für Bodendenkmalpflege, Augsburg (inv. nos 66801–66842).

113 Emmerting – Bruck, tumulus 2
(Kreis Altötting, Reg.-Bez. Oberbayern)

References: Ohlenschläger 1875, 103; Weber 1909, 4–5; Kossack 1959, 189–190. Unpublished manuscript by P. Reinecke, dated 1918, in the Bayerisches Landesamt für Denkmalpflege, München ('Zu den Grabhügelfunden von Bruck a. d. Alz'). According to Weber, a further unpublished manuscript by A. Richter, dated 1831, is located in the Archiv des historischen Vereins von Niederbayern, but this seems to have been lost ('Kurze Beschreibung über die im königlichen Landgerichts- und Forstrevierbezirk Altötting zunächst dem Orte Bruck a. d. Alz sich befindlichen sogenannten Römergrabhügeln nebst einem Anhang mit Notizen zur Topographie von dem königlichen Revierforster Augustin Richter zu Altötting im Januar 1831'. Presidialakt der königlichen Regierung von Nieder-

bayern, die Erhaltung der im Königreiche zerstreuten architektonischen und plastischen Denkmale der Vorzeit betr., I. Fasc. v. Jahre 1829-35, einschl. Akt. Nr. 10 Jänner 1831, Seite 55).

Description: Richter described the tumulus cemetery as having 52 tumuli, measuring 20-85' in diameter (5.84-24.82 m), and 2-10' in height (0.58-2.92 m). He excavated most of the tumuli. To the N were three large tumuli, two of 70' (20.43 m) and the third of 85' diameter (24.81 m). The mass of the tumuli were scattered to the S and SW of these three, and measured 20-50' in diameter (5.84-14.59 m).

In the largest tumulus, tumulus 3 (diameter 85', 24.81 m), were found large animal bones and some decorative horse trappings. In one of the other large tumuli, tumulus 2 (diameter 70', 20.43 m; height 10', 2.92 m), was a wagon with four iron tyres. 'Der Wagen selbst ist stehender vergraben worden und die Stellung der hinteren von den vorderen Rädern kann 7 bis 8 Fuß Entfernung betragen, seine Weite aber 4 bis 5 Fuß. Die vorderen Räder waren 3 höchstens 3½ Zoll kleiner als die hinteren' (Reinecke, quoting a letter from Richter, dated 1831). Thus the gauge of the wagon should be ca. 1.17-1.46 m and the wheel base ca. 2.04-2.33 m; the diameter of the front wheels was apparently 87-102 mm smaller than that of the back wheels.

Comments: Among the tyre fragments from these excavations, in the Landshut museum, it is possible to distinguish two different types. Both types do not necessarily come from tumulus 2. Considering the incomplete nature of Richter's report, he could easily have found another wagon-grave without mentioning it. On the other hand, some of the tyre fragments could have come from another grave from this region, whereby Altdorf (cat. no. 101) would be the most likely candidate. Nevertheless, it is interesting that Richter mentioned that the wheels from tumulus 2 had different diameters, and it may be that both types of tyre were used on the same wagon.

A hand-written report by A. Richter, dated ca. 1839, with water-colour illustrations and a plan could not be located either in the archive of the Historischer Verein, Landshut, or in the Bayerisches Staatsarchiv, München.

Finds:

- 1) Five fragments of iron tyres with type II cross-section, width ca. 20 mm. The nails were hammered in every 98-133 mm, and were preserved to a maximum penetration of 79.5 mm. The nail heads are small (ca. 10 × 4 mm) and countersunk (type G). Wood grain is preserved on the nails, and is horizontal both at the base and at the tip of the nails. At a penetration of ca. 36-40 mm, there may be slight traces of a join between the inner and outer felloe rings. Diameter of tyres ca. 760 mm. (Cat. no. 113/i; Pl. 72, 1)
- 2) Four fragments of iron tyres with type II cross-section, width ca. 25 mm. The nails were hammered in every 127-147 mm, and indicate a felloe 104 mm high. The nail heads are globular (ca. 11-14 × 11 mm) and project above the level of the tyre surface (type B). Diameter of tyres ca. 950 mm. (Cat. no. 113/ii; Pl. 72, 3-5)
- 3) Two fragments of an iron nave-cap of type Breitenbronn, made of ribbed iron sheet. The axle-channel is ca. 43 mm in diameter. (Pl. 72, 2)

Museum: Stadt- und Kreismuseum, Landshut (inv. no. A. 610).

114A Großeibstadt, cemetery I, grave 1 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)

References: Kossack 1970, 44-61; Kossack 1971.

Description: Excavations took place in 1954, when seven graves were found. However, the cemetery could have been larger, for example extending to the W of the excavated area (Kossack 1970, pl. 28, 1). The tumuli of this cemetery have been completely levelled by agricultural activity and the old ground surface has also been lost.

The stone packing of grave 1 was encountered by the farmer during ploughing and, on digging a hole ca. 2 × 1 m in size, he came upon parts of a human jaw-bone, fragments of an iron sword, iron tyres and bronze nave fittings. Upon excavation, the stone packing was found to measure 5.50 × 2.80 m, and was orientated NNW-SSE. The stone packing covered a rectangular grave pit 5.80 m long, 2.80 m wide at the N end, 2.10 m wide at the S end, and orientated NNW-SSE. The N part of the pit was found to be deeper (1.13 m) than the S; a step separated the N from the S part, which was 0.89 m deep at the step, sloping down to 1.08 m in depth at the narrow S end. The grave pit contained a wooden chamber, the size of which could not be discerned.

The burial was an inhumation, apparently a male of about 40 years; he lay on his back with his head to the S and feet to the N, in the middle of the N part of the grave pit (Fig. 184). Owing to the position of the skeleton, the excavators believed that the body lay on the floor of the grave and not, as one might have supposed, on the box of the wagon.

The disturbance caused by the farmer's excavation effected the personal goods of the burial, the skeleton and the two front wheels of the wagon. By the skeleton were: a bronze ring toggle (Kossack 1970, pl. 32, 1), two small iron studs with biconical heads (ibid. pl. 32, 2), five iron pin-like objects with large hollow biconical heads (ibid. pl. 32, 3), an iron sword (ibid. pl. 32, 4), three small bronze rings (ibid. pl. 32, 5) and two short thin rods, one of bronze and the other of iron (ibid. pl. 32, 6-7). The grave was also provided with 34 pottery and three bronze vessels; all but three were in the S part of the grave. In the S half of the grave was an iron knife associated with a collection of animal bones (ibid. pl. 32, 8).

In the middle of the S half of the grave lay the yoke and horse harness. The wooden yoke was covered with leather set with numerous small bronze sheet decorative knobs, arranged in closely-spaced parallel rows, with occasional larger bronze sheet knobs (ibid. pls 38B, 66; 39, 67). These yoke remains were distributed in an E-W direction for about 1.20 m. By the yoke were six bronze openwork *Jochschnallen* (ibid. pl. 38B, 52-57) and four large bronze rings (ibid. pl. 39, 59-62). Two more bronze rings were also found close by (ibid. pl. 39, 58, 63). Whether two bronze forked socketed objects belong with the yoke is an open question; they were found at the S end of the grave. The ends of the forked sockets terminated in biconical knobs and were originally provided with iron rings (ibid. pl. 39, 64-5).

S of the yoke were the remains of harness for two horses: two bronze bits, two 'T'-shaped bronze toggles, four bronze rings, eight ring-footed rein-knobs and eight square bronze rein ornaments (ibid. pl. 39, 68-91). The reins of the harness were laced through numerous bronze looped knobs (ibid. pl. 39, 92).

The wagon has been described in detail by Kossack (1970; 1971), and his conclusions will be summarised below. The excavators found wheel remains in the N part of the grave, standing vertically encased in a deposit of silt which had entered the grave chamber before the collapse of the wooden roof. This shows that the wheels must have been mounted on their axles, and implies that a complete wagon was provided in the grave - although no metal fittings from the wagon-box were found. The position of the metal wheel fittings shows a gauge of 1.16 m and a wheel base of 1.50 m.

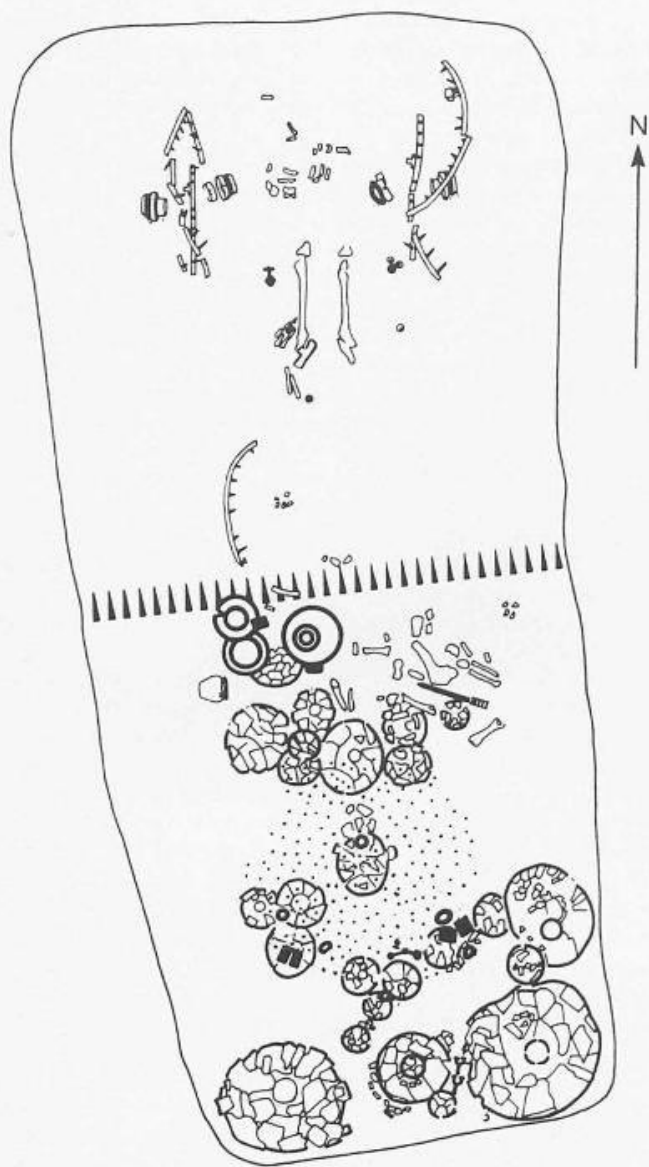


Fig. 184 Großeibstadt, cemetery I, grave 1: plan of the grave pit (after Kossack 1970). – Scale 1:40.

The iron tyres were ca. 23 mm wide, with a plain flat inner surface and profiled external side (type Ia). The external side had a central groove 9 mm wide which accommodated the long heads of the nails (nail type A). On either side of the groove was a raised rib, resulting in a beaded cross-section. The tyre was fixed by nails driven in every 65–75 mm, which had long thin heads which almost touched each other. Kossack estimated that each tyre had about 32 such nails. The nail shafts had a rectangular cross-section and tapered to a point. They were originally ca. 90–95 mm long and reached through the whole thickness of the felloe. The sides of the nail shanks often preserve imprinted wood grain, which could be either diagonal or horizontal. (e.g. Pl. 73, 1). The felloes were held together by two types of iron clamps, 'U'-shaped and 'T'-shaped (Pl. 73, 2–3). Wood grain preserved on the nails and clamps allowed Kossack to make an idealised reconstruction of such a wheel (Fig. 55). The felloes were constructed in two layers, with a bent one-piece inner felloe and an outer felloe composed of several plank

segments (the outer and inner felloes were of roughly equal thickness, ca. 45 mm each, resulting in a felloe height of ca. 90 mm). The 'T'-shaped clamps covered the joins of the plank segments, with the bottom of the clamps reaching onto the bent felloe. The inner surfaces of the 'T'-clamps therefore show a characteristic structure of wood grain (Pl. 73, 3). The plank segments have a blunt butt joint. The angle between the grain of the segments at the join, measured from all the surviving 'T'-clamps and fragments, varies between 120° and 136°. Applying simple geometry, it is therefore possible to estimate between six and eight plank segments in the outer felloe, with eight segments being more probable. The ends of the single-piece spanned inner felloe were fastened together by a single 'U'-shaped clamp (Pl. 73, 2). Slight wood remains show that this too covered a blunt butt-joint.

The inner surfaces of the tyres also preserve imprinted wood grain, sometimes interrupted by rectangular imprints measuring 27–32 × 10 mm (for example two are visible on Pl. 73, 1). These were interpreted by Kossack as the ends of the spokes, which were set into sockets in the felloes. According to Kossack, measurement of the interval between these imprints shows that the spokes were most probably set at an average interval of 130 mm. This would result in a total of 16 spokes per wheel.

Each nave was provided with 10 separate metal fittings. The ends had simple flat iron rings with an axle-channel 49 mm in diameter. The nave-head was fitted with three metal bands to form a rounded conical shape: two iron bands and between them a bronze band. The greatest diameter of the nave-head was 120 mm (Pl. 73, 4). The nave-necks were sheathed with a broad iron band which was overlapped and joined by two nails. The naves were 330 mm long, completely sheathed in metal except for the central 130 mm, where the bases of the spokes were set (Pl. 73, 4).

Comments: It should be emphasised that Kossack's drawing of the wheel construction is idealised (Fig. 55). The wood grain impressions from the tyres and felloe-clamps show, as pointed out, that the standard of craftsmanship seems to have been low: the spokes and tyre nails were not set particularly regularly, and the outer plank felloe segments were probably of irregular lengths and may not have been made from straight-grained wood (witness the varying angles of the wood grain on the 'T'-shaped felloe-clamps and on the tyre nails). Kossack went further, and suggested that the wagon was not deposited in the grave in a functioning condition. He pointed out that the two intact wheels, the NW and NE, had only three and five 'T'-shaped clamps respectively, instead of the estimated eight required for each wheel. He also remarked on the lack of nave-stock rings, and the lack of axle-caps and linchpins to hold the wheels onto the axles.

Museum: Prähistorische Staatssammlung, München (inv. nos 1965, 1243–1246).

114B Großeibstadt, cemetery I, grave 4 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)

References: Kossack 1970, 75–84.

Description: This grave was excavated in 1955. The excavators found a ring-ditch 23 m in diameter (probably marking the foot of a tumulus), and at its centre a stone packing. The stone packing was rectangular and orientated NNW-SSE, measuring 5.50 × 2.40 m; it covered a grave pit with the same orientation, measuring 5.0 × 1.90 m (Fig. 185). As in the case of grave 1, the tumulus had been levelled and the old ground surface was lost.

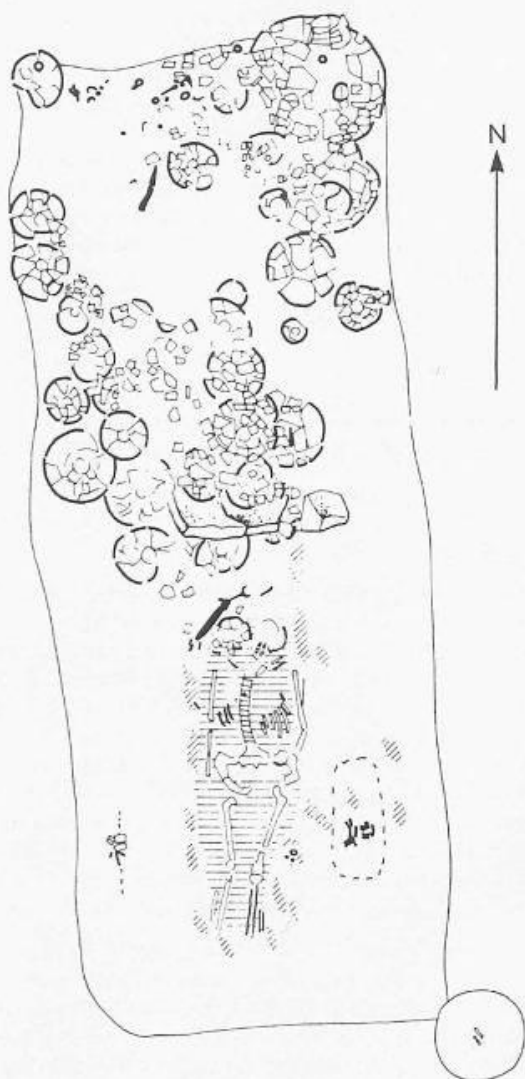


Fig. 185 Großfibstadt, cemetery I, grave 4: plan of the grave pit (after Kossack 1970). — Scale 1:40.

The N and S parts of the grave were separated by three stone slabs, which reached a height of ca. 200 mm. The S part of the grave housed pottery and horse-gear, the N part the wagon and inhumation. The inhumation lay on its back with its head pointing to the S; the skeleton was of a male, aged 20–30 years. Some of the bones of the skeleton were found 300–600 mm above the floor of the chamber, and this suggests that the body may have lain on the wheeled vehicle. Indeed, the excavator noted an area of dark organic matter measuring ca. 2.30×1.20 m, extending northwards from the stone slab partition.

By the spine of the skeleton, just under the collar bones, was an amber ring (Kossack 1970, pl. 63, 3). Near the left knee were a small iron ring and two bronze sheet knobs (ibid. pl. 63, 4.5). Kossack suggested that these could be the incomplete remains of a belt (1970, 78). S of the skull was a small fragmentary iron rod (ibid. pl. 63, 2), and at the right shoulder was an antenna-hilted iron dagger (ibid. pl. 63, 1). It should be emphasised that the position of the skeleton with its personal goods must have been disrupted by the collapse of the organic platform on which it originally lay (possibly the vehicle box, see above). In the S part of the grave were 56 pottery vessels and an iron knife which,

exceptionally, was not accompanied by animal bones (ibid. pls 63, 6; 65–67).

At the S end of the grave were remains of harness for two horses: two iron bits, four iron ring-footed knobs (Fig. 102, 9–10), four iron rings, and one bronze ring (ibid. pls 63, 7–15; 64, 16).

The tumulus was built on a sloping piece of ground, but the floor of the grave was made roughly level. However, in the floor of the grave were some slight hollows in which were positioned the tallest of the grave goods, the two largest pottery vessels, and there were two shallow slots for the wheels of the vehicle. With a height of 480 mm, the highest vessel was placed in a hollow 100 mm deep and, if the hollow was really made to accommodate the vessel under a low chamber roof, then a chamber only 380 mm high would have to be accepted for the S end of the grave. The diameter of the wheels is not known, owing to the lack of iron tyres, but the nave fittings of the E wheel were found 250 mm over the bottom of the E hollow. The excavator thought that this would imply a diameter of not more than 400–500 mm, and suggested an internal height of 400 mm for the chamber (Kossack 1970, 77). However, the wooden parts of the wheel may have rotted before the silt, gradually filling the grave chamber, reached the nave, and so the height of the silt (250 mm) gives only a *minimum* for the radius of the wheel.

Above each of the slots were found iron nave fittings. Each wheel had two iron bands: a nave-stock ring (120 mm in diameter, 16 mm wide, Pl. 74A, 1), and a nave-neck sheathing (75 mm in diameter, 57 mm wide, Pl. 74A, 3). Only the outer nave half seems to have been provided with iron fittings. The W wheel-slot measured 600×200 mm with a depth of 150 mm, the E slot measured 400×180 mm. The slots were 1.10 m apart. As mentioned above, a wheel diameter of ca. 400 mm was suggested by the excavator, and this was reinterpreted here as a minimum value. As Kossack noted (1970, 80), the diameter of the nave-stock rings, 120 mm, is normal for wheels of the Hallstatt period and would not suggest miniature wheels.

Comments: Concerning the reconstruction of the vehicle, the position of the body and the wheel-slots requires a long thin vehicle box which would necessarily have coincided roughly with the dark organic area which measured ca. 2.2×1.2 m. Taking this as an estimate of the size of the vehicle box, the back axle would have been positioned 600 mm from the rear of the box and 1.6 m from the front. This much can be drawn from the excavation findings, and from this two reconstructions can be offered, neither of which is fully satisfactory (Fig. 186). A

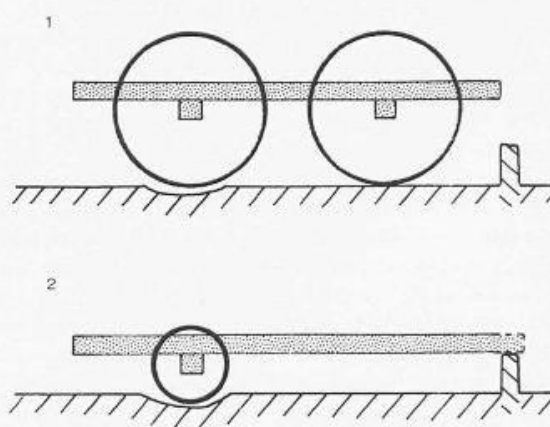


Fig. 186 Großfibstadt, cemetery I, grave 4: two possible reconstructions for the wheeled vehicle. — Scale 1:40.

reconstruction of the vehicle with four large wheels is possible (Fig. 186, 1), but would not explain (i) the presence of only two wheel-slots, (ii) the lack of iron fittings for the front wheels, (iii) the height of the vehicle, which would not fit into the low grave chamber indicated by analysis of the grave profile (Kossack 1970, pl. 60). A reconstruction with two small wheels (Fig. 186, 2) could explain (i) the two wheel slots, (ii) the two sets of wheel fittings, and (iii) the stone slabs set in the middle of the grave, which could have supported the front of the vehicle box. This reconstruction does not, however, suggest a useful, functional, vehicle – instead perhaps a funeral cart specially made for the burial, which would explain the lack of iron tyres and feeble nave fittings of the wheels. The evidence seems to support the two-wheeled reconstruction.

Museum: Prähistorische Staatssammlung, München (inv. nos 1965, 1363–1364).

115A Großleibstadt, cemetery II, grave 2 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)

References: Wamser 1980b, 100–101; Wamser 1981a, 227–248; Wamser 1981b, 40–41 and 104–105; Schifferdecker and Wamser 1982, 59–61.

Description: The results of the excavation of this cemetery, which took place in the years 1980–1982, have only been published in preliminary reports and the author is very grateful to Michael Schifferdecker, Würzburg, for additional information concerning graves 2, 4 and 14. Cemetery II (Fig. 140) lay only 1.5 km W of cemetery I, and contained 48 graves and 12 burnt pits (pits with burnt sides, filled with ash and stones, but with no burial remains). Eight of the graves contained inhumations in large rectangular sunken grave pits and were originally covered by tumuli; six of the large graves contained horse trappings, of which three also had wagon remains. Most of the other graves were flat cremations.

Grave 2 had a rectangular pit measuring 5 × 2.6 m, 850 mm deep, orientated NNE-SSW (Fig. 187). The grave pit was lined with wooden planks. The N part of the grave was disturbed, but originally contained the skeleton of an adult male. Around him were the remains of a four-wheeled wagon, which had been badly damaged by the disturbance. The personal goods of the inhumation consisted of an iron swan's neck pin and an iron toilet set. It has been suggested that the burial may have been provided with a weapon, which was subsequently robbed or lost owing to the disturbance. To the E of the skeleton was a bronze bowl with omphalos and embossed ring decoration on the rim (Wamser 1981a, 234, fig. 9). To the S and W of the bronze bowl were 19 pottery vessels and an iron knife associated with animal bones. At the S end of the grave was the horse-gear, consisting of two iron bits with iron rings, iron 'omega-clips', eight bronze ring-footed rein-knobs with broad flanges and eight bronze looped rein-knobs with broad flanges.

Wamser, on his plan of the grave (Fig. 187), estimated the original position of the four wagon wheels. It should be noted, however, that the few tyre fragments found *in situ* were from the SE wheel, which must be undisturbed because of the undisturbed position of the pottery vessels which surround them (Fig. 187). The nave of the NW wheel (Fig. 187) was not found where it is shown on Wamser's plan, but about 500 mm to the E – obviously displaced during the disturbance of this part of the grave. Owing to the position of the wheel remains and the pottery vessels, it seems that the box of the wagon was above the pots (i.e. the wagon was probably deposited intact) and the inhumation probably lay upon it.

Wagon finds:

- 1) Iron nave fittings (variant I of the Breitenbronn type). The nave-stock and nave-head rings bear engraved linear decoration. The nave-cap is ribbed. The nave-neck is covered by a band of iron sheet held by a pair of large-headed iron nails. (Pl. 74B, 1.8–9)
- 2) Tyre nails with large rectangular heads, of type A (? or C). One nail shank bears diagonal wood grain. (Pl. 74B, 3.7)
- 3) Fragments of iron felloe-clamps, indicating a felloe at least 75 mm high. One clamp bears diagonal wood grain. (Pl. 74B, 2.4–6)

Museum: Prähistorische Staatssammlung, München.

115B Großleibstadt, cemetery II, grave 4 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)

References: Wamser 1980b, 100–101; Wamser 1981a, 227–248; Wamser 1981b, 40–41 and 104–105; Schifferdecker and Wamser 1982, 59–61.

Description: For a description of this cemetery (Fig. 140), see cat. no. 115A. This grave was found to measure ca. 2.2 × ca. 4.75 m, orientated NNW-SSE. The inhumation was rather disturbed, but the original position was clearly in the middle of the N part of the grave, orientated (head)SSE-NNW(feet). Near the skeleton was an iron chape and scabbard remains. The antenna dagger belonging to the scabbard (type Sesto-Calende according to Wamser 1981a, 240) was in the SW corner of the grave, associated with animal bones. To the W of the inhumation, near the W side of the grave, were two iron linchpins (Pl. 74C). The SE side of the grave was lined by pottery vessels. By the S end of the grave were two iron bits, iron rings and iron 'omega-clips'.

Comments: Surprisingly little pottery seems to have been provided in this grave, only three vessels are visible on the plan. The position of the antenna dagger, associated with the animal bones, is untypical: it would normally be found alongside the skeleton, and an iron knife would be provided for the meat offering. The most puzzling feature of this grave is the provision of two linchpins along the NW side of the grave. When linchpins are provided as *pars pro toto*, they normally mark the expected position of the wheels of a four-wheeled wagon.

Museum: Prähistorische Staatssammlung, München.

115C Großleibstadt, cemetery II, grave 14 (Kreis Rhön-Grabfeld, Reg.-Bez. Unterfranken)

References: Wamser 1980b, 100–101; Wamser 1981a, 227–248; Wamser 1981b, 40–41 and 104–105; Schifferdecker and Wamser 1982, 59–61.

Description: For a description of this cemetery (Fig. 140), see cat. no. 115A. The excavation of this grave took place in 1981 and the excavators found a stone packing measuring ca. 8 × 3.5 m, surrounded by a stone ring 14–16 m in diameter. The stone packing covered a grave measuring 5.7 × 2.4 m, orientated NNW-SSE, the floor of which was 2 m under the present day ground surface (Fig. 188). The N half of the grave was slightly deeper than the S half, from which it was separated by a low step. In the middle of the N half lay a disturbed extended inhumation, orientated (head)SSE-NNW(feet). The burial was surrounded by the remains of four wheels, with iron tyres ca. 700–800 mm in diameter. The NE wheel may have rested in a slot, which would imply that the height of the chamber at that

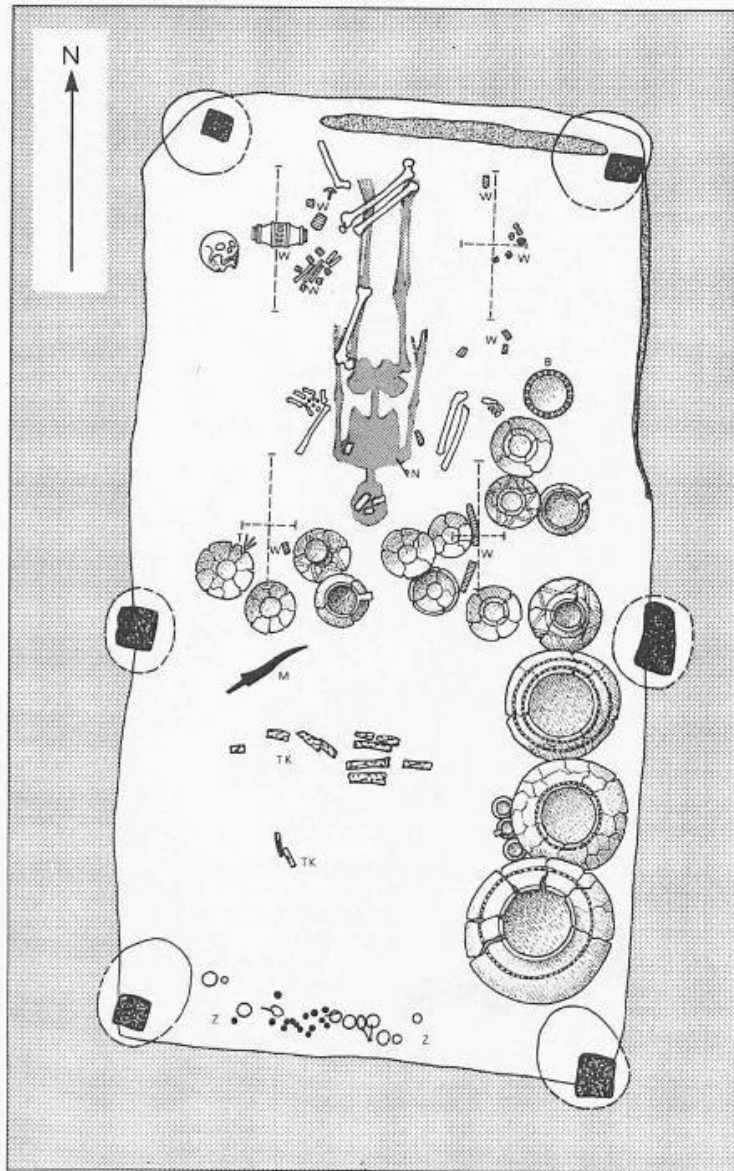


Fig. 187 Großleibstadt, cemetery II, grave 4: plan of the grave pit (after Wamser 1981a). — Scale 1:40.

point would correspond with the height of the wheels, i.e. 700–800 mm. The tyres were provided with long closely-spaced nails; the S pair of tyres was completely preserved, the N pair was disturbed and had partly been lost. The naves of the wheels were clad in iron, and 'corresponded exactly to those of cemetery I, grave 1' (Wamser 1981a, 246). On a photograph kindly provided by M. Schifferdecker, the naves indeed have the same mushroom-shaped heads, but the nave-head sheathing seems to be made exclusively of iron bands, unlike that of cemetery I, grave 1, which has an iron band on each side of a bronze band. The position of the iron wheel fittings shows that the wagon had a maximum gauge of ca. 1.2 m.

The grave was provided with 33 pottery vessels and three bronze vessels ('punzverzierte Breitrand-Fußschale; Situla, aus mehreren Teilen zusammengesetzt, mit Eisenhenkeln; kleines punzverziertes

Schöpfkännchen mit Hebelgriff': Wamser 1981a, 246; 235, fig. 10). In the S part of the grave were also three iron spits and a large iron knife.

The grave contained rich horse-gear which was placed in the middle of the S half of the grave. This included two iron bits, octagonal bronze rein-sleeves (like Kossack 1970, pl. 39, 84–91), looped bronze rein-knobs (like *ibid.* pl. 39, 92), bronze ring-footed rein ornaments with pointed tops (like Dvořák 1938b, 32, fig. 30, 2), a pair of iron sockets each with two lens-shaped hollow knobs, and about 90 iron rings, including a chain with large links, paired rings and single rings. The ring-pairs came in two sizes and consisted of a smaller ring with a rod-shaped projection which fitted into the opening of the larger ring.

Museum: Prähistorische Staatssammlung, München.

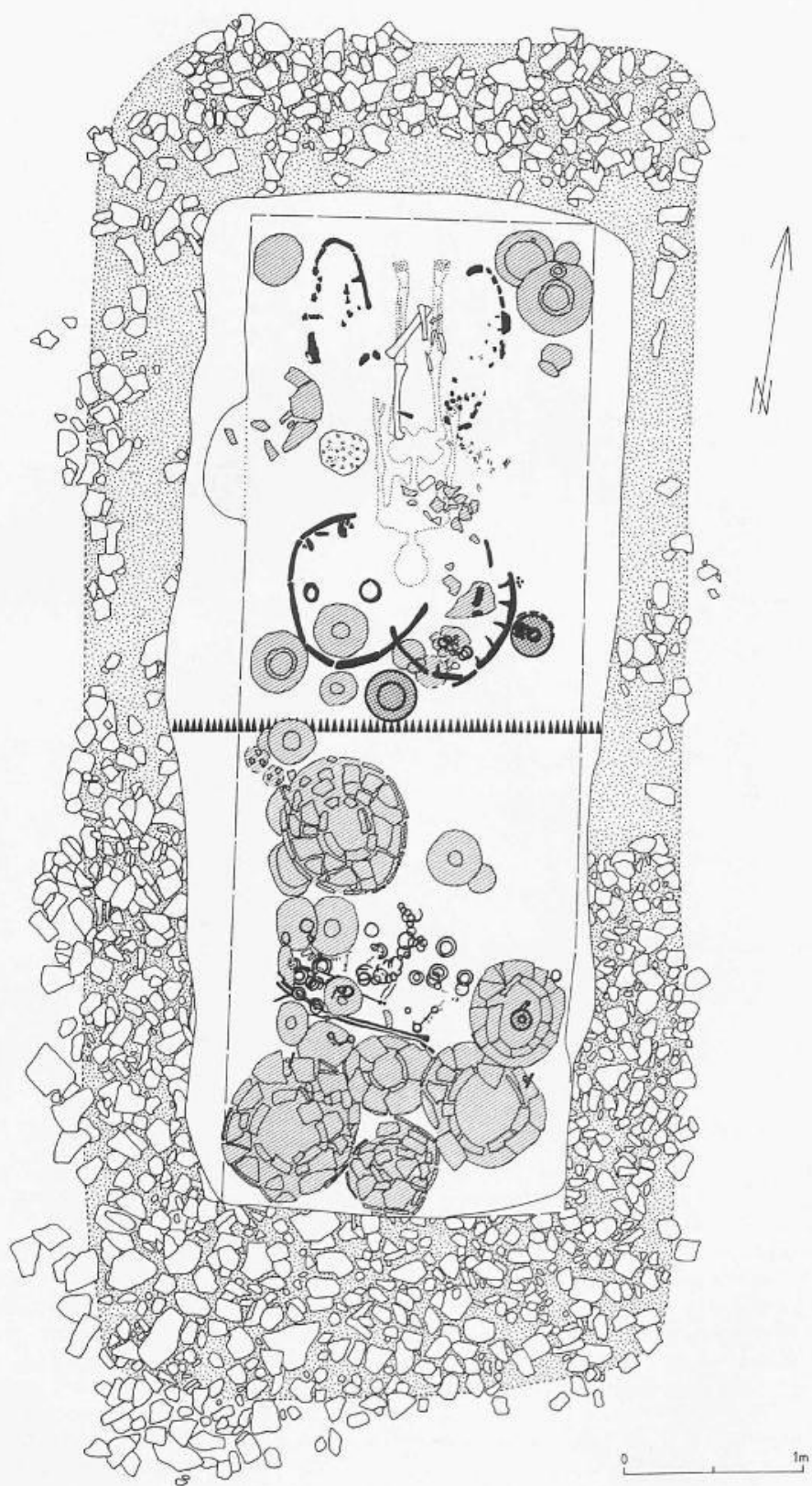


Fig. 188 Großeibstadt, cemetery II, grave 14: plan of the grave pit (after Wamser 1981a).
— Scale 1:40.

116 Haldenwang, finds from 1934

(Kreis Günzburg, Reg.-Bez. Schwaben)

References: Auer 1937, 109–110; Stroh 1952, 24; Kossack 1959, 155.

Description: In a cemetery of seven tumuli, one tumulus was destroyed in 1934 during road building. A few finds could be rescued, including: sherds of two pottery vessels – one of which is a conical-necked vessel (*Kegelhalsgefäß*) according to Stroh (1952, 24) – fragments of a bronze situla, a fragmentary iron socket, a fragmentary iron ring and tyre fragments. The wheels are supposed to have left traces on the base of the tumulus, showing a diameter of 950 mm.

Finds:

- 1) 10 fragments of iron tyres, 21 mm wide, and three fragmentary nails. The tyres have a type II cross-section. The nails carry horizontal wood grain; one fragment is 65 mm long, but the felloe was probably considerably higher. The nails had large subrectangular heads, the positions of which frequently do not seem to correspond with the nail shanks. (Pl. 75A, 1–2.4–5.7)
- 2) One fragment of iron sheet, possibly from a felloe-clamp (?). Width 31 mm. (Pl. 75A, 6)
- 3) Fragmentary iron socket, 61 mm long. The end is broken off and the remaining fragment indicates a spherical or cup-shaped terminal. (Pl. 75A, 3)
- 4) 22 fragments of a large undecorated bronze situla. The fragments include the 'scam' of the vessel, which was held together with bronze rivets, flat on the outside (ca. 12 mm in diameter) and domed on the inside of the vessel. The rim was bent around a hollow bronze sleeve, 4 mm in diameter.
- 5) Remains of an iron ring, round in cross-section, diameter 25 mm.
- 6) Two pottery sherds (remains of two pottery vessels?).

Museum: Prähistorische Staatssammlung, München (inv. no. 1961, 597).

117 Harburg – Marbach, tumulus 1 of 1973

(Kreis Donau-Ries, Reg.-Bez. Schwaben)

References: Krahe 1977, 37. Unpublished manuscript by K. H. Henning, dated 1974, in the Bayerisches Landesamt für Bodendenkmalpflege, Augsburg ('Bericht über Rettungsgrabungen ...').

Description: The W part of the tumulus was destroyed during the building of a path in 1973. The remains of the tumulus were subsequently excavated by the Bayerisches Landesamt für Bodendenkmalpflege. The excavators found a central grave surrounded by a stone circle, 15 m in diameter, which probably originally marked the edge of the tumulus. Most of the central grave had been destroyed, only the NE corner survived (Fig. 189). The grave was marked by a rectangular stone packing (? ca. 4.8 × at least 5 m), which had probably protected the outside of a wooden chamber. The chamber was orientated N-S or NNW-SSE. When the stone packing had been removed from the inside of the chamber, the surviving grave goods could be seen (Fig. 189). On the E side were two large conical-necked vessels (*Kegelhalsgefäße*), inside the northern of which was a third small vessel. S of the southern vessel were a few more sherds. W of the pottery vessels were the remains of sheet bronze nave sheathings, iron wagon parts and some wooden remains.

Finds:

- 1) About 25 fragments of iron tyres of type Ib, ca. 24 mm

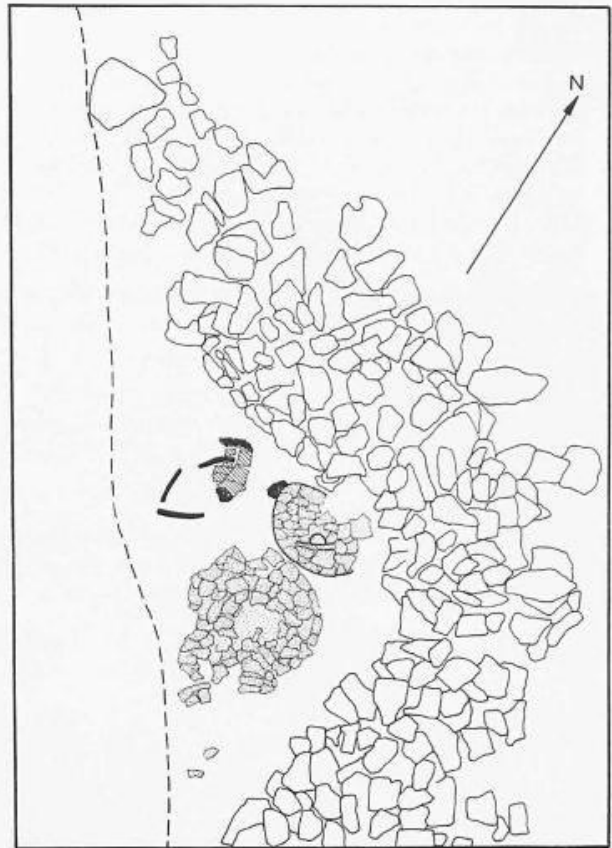


Fig. 189 Harburg-Marbach, tumulus 1 of 1973: plan of the surviving north-east corner of the grave chamber (iron: black; bronze: hatched; pottery: stippled). – Scale 1:50.

wide. The tyre was fixed to the felloe by nails with long heads (length 62–76 mm), driven in every ca. 95 mm (type A). The longest surviving nail has a penetration of 54 mm. One nail shank shows traces of diagonal wood grain. (Pl. 75B, 4–5)

- 2) Remains of two 'T'-shaped felloe-clamps, each originally provided with four nails or rivets. One of the clamps shows traces of horizontal wood grain. (Pl. 75B, 2–3)
- 3) Remains of bronze and iron nave sheathings. The nave-head was covered by an iron cap 147 mm in diameter, with profiled cross-section. The nave-neck has a conical sheathing decorated with three ribs. The nave-neck sheathing is held together by a row of six iron nails. In the centre of the nave, the spaces between the 10 spokes are covered by a series of 'T'-shaped bronze sheets decorated with point bosses. (Reconstruction on Pl. 75B, 1)
- 4) A few small iron fragments.
- 5) Two large conical-necked vessels (*Kegelhalsgefäße*), one of which has vertical grooved decoration on its red-painted shoulder; alternate pairs of grooves bear graphite painting. The neck is painted red and has three vertical stripes. Similar grooved and painted decoration is seen on vessels from Mindelheim tumulus 11, Graben tumulus 11 and Staatswald Mühlhart tumulus 66 (Kossack 1959, pls 27, 7; 59, 13; 69, 18). Similar vertical grooves are also seen on a vessel from Wildenroth-Grafrath tumulus 13, here again with three vertical black stripes on the neck (Kossack 1959, pl. 75, 4).

- 6) Two small spherical-shaped vessels, one with a slight conical neck, the other with an everted collar. Both had similarly-painted vertical grooves.
- 7) One depressed-spherical vessel with high cylindrical neck; the body bears vertically-arranged groups of engraved zig-zag lines. Similar decoration is seen on vessels from Schöngeising and Aschering tumulus 4 (Kossack 1959, pls 62, 21; 90, 5). The shape of the vessel is comparable to an example from Fürstenfeldbruck (Kossack 1959, pl. 63, 23), but the one from Harburg-Marbach has a small foot.

Present location: Bayerisches Landesamt für Bodendenkmalpflege, Augsburg and Stadtmuseum Donauwörth (inv. no. D. 105).

118 Hilpoltstein – Weinsfeld, 'Lohe', tumulus 4, grave 5
(Kreis Roth, Reg.-Bez. Mittelfranken)

References: Wamser 1981a, 250–1; Wamser 1982, 163–196.

Description: The grave was marked by a central stone packing, roughly square in shape, which was ca. 5.6×5.6 m in size. The grave pit measured ca. 4.2×3.7 m, with a depth of 1.25 m, and

enclosed a wooden chamber measuring 3.5×3.2 m (Fig. 190). The chamber was orientated NNW-SSE. The inhumation burial lay in the W part of the chamber, with its head orientated to the S. The skeletal remains indicate a male 50–60 years old. Close to the left upper arm was a bronze drum fibula (*Paukenfibel*), a second identical fibula was originally positioned by the right upper arm. Between the thighs was an iron razor, and by the right foot was a fragmentary iron spearhead. To the E of the burial were the bones of a pig. The E part of the chamber was occupied by a four-wheeled wagon, partly damaged by disturbance. The surviving remains show that the wheels originally stood upright in the grave and the E wheels had the linchpins *in situ* by the axles, showing that the wagon was deposited in the grave fully assembled. The gauge of the wagon was ca. 1.17 m, and the wheel base measured 1.8 m. Between the two S wheels were the remains of iron and bronze horse-gear and a large pottery vessel. Between the two N wheels was a bronze bowl with repoussée decorated rim and a large iron knife. A little to the S was a pottery vessel containing two small wire rings, one of iron the other of bronze. Wamser suggests that the pottery and bronze vessels, and the iron knife, could originally have been positioned on the box of the wagon.

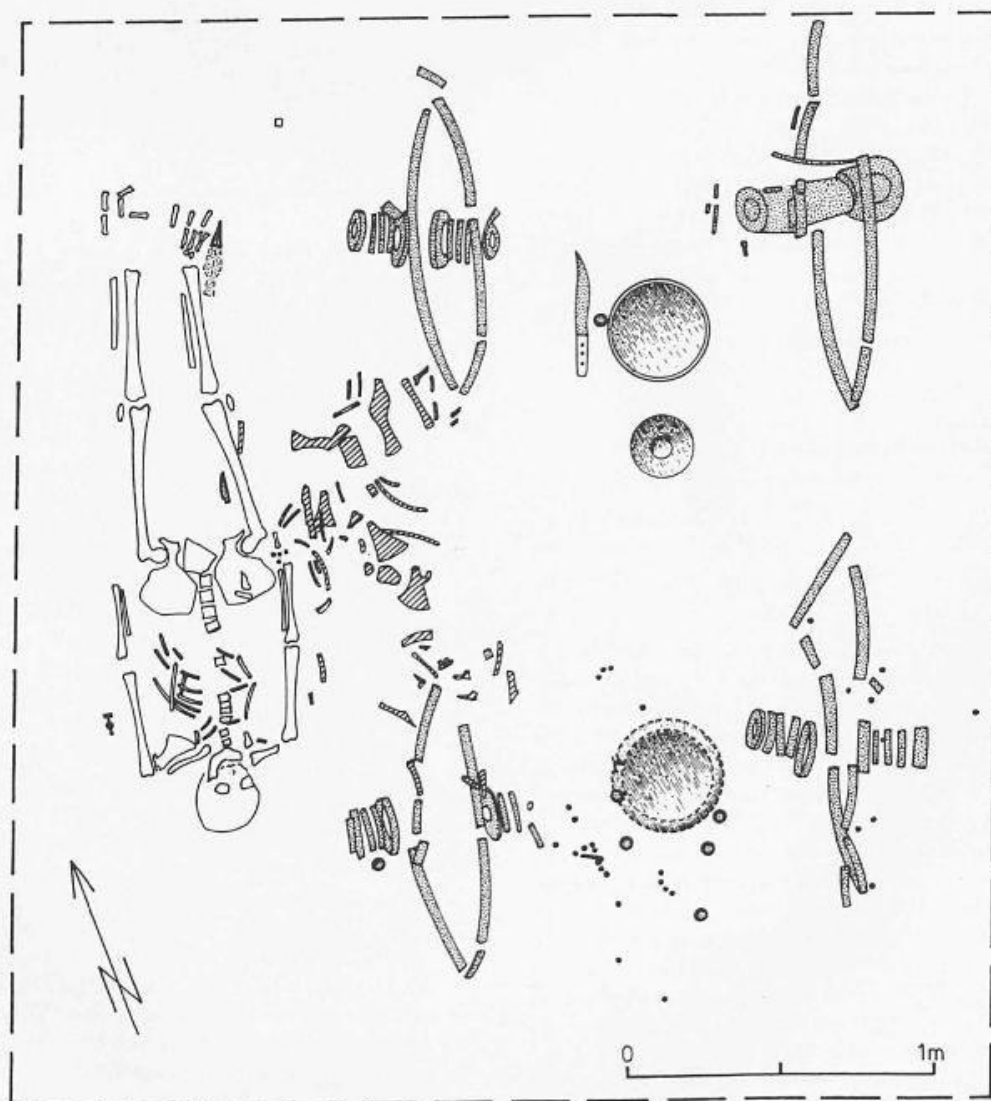


Fig. 190 Hilpoltstein-Weinsfeld, 'Lohe', tumulus 4, grave 5: plan of the grave chamber (after Wamser 1981a). – Scale 1:25.

Finds:

- 1) Fragmentary remains of four iron tyres, width 35–39 mm, with flat type VII cross-section. The tyres were fastened by nails driven in every 90–130 mm. These were of two types, one with a small round head (diameter 7–10 mm), the other type with a flat squarish or subrectangular head (13–25 × 13–25 mm). Wamser reconstructed the NE wheel with an irregular arrangement of large and small-headed nails, but his reconstruction could not be tested, owing to the fragmentary condition of the tyres. Wamser also stated that the ends of the larger nails were bent over the inside of the felloe. Tyres and nails preserve traces of wood grain, which is always horizontal. An impression of one spoke-socket was preserved on the inside of a tyre; it was rectangular in shape, measuring 6.5 × 20 mm. Wamser reconstructed a felloe thickness of 61 mm, and this is confirmed by some well-preserved nails. The diameter of the tyres could be estimated as 860 mm, judging from the position of the tyres on the grave floor. (Pl. 77A)
- 2) Fragments of iron felloe-clamps (Pl. 76, 15–16). According to Wamser, one felloe-clamp could be reconstructed, and had a height of 58.5 mm with a maximum width of 42 mm (Wamser 1982, 189, fig. 19, 2a).
- 3) Iron linchpin and another fragment. The shaft of the linchpin measures 68 mm in length and the distance between the top of the shaft and the hole at the bottom was 56 mm. (Pl. 76, 12–13)
- 4) Remains of iron nave fittings, consisting of an iron ring from the nave-stock, three iron rings from the conical nave-neck and an axle-cap. Wamser was able to reconstruct a length of 337 mm for the nave, a nave-stock diameter of 160 mm and an axle-cap diameter of 120 mm. The axle-cap had an axle-channel measuring in one case 57.7–58.7 mm in diameter, and in the other case 65.3–68.7 mm in diameter. The axle-caps were also slightly different in profile, one with a rather bevelled entrance to the axle-channel, the other with a simple right-angled entrance. In Wamser's drawing, the axle-cap with the bevelled axle-channel was on the side of the nave facing the wagon and as this axle-cap had a slightly larger axle-channel diameter, the axle arms may have been slightly tapered. (Pl. 76, 1–11; Wamser 1982, 189, fig. 19, 1; 1981a, 239, fig. 14, 2)
- 5) Iron band, 22–23 mm wide and 79 mm long, one side bearing slight traces of wood grain. (Pl. 76, 14)
- 6) Iron looped fragment, 48 mm long. (Pl. 76, 17)
- 7) 36 bronze rein-knobs. (Wamser 1982, fig. 17, 1–36)
- 8) 'T'-shaped iron toggle. (ibid. fig. 16, 1)
- 9) Three cheek-piece rings. (ibid. fig. 16, 2–4)
- 10) Small iron wire ring. (ibid. fig. 16, 6)
- 11) Small bronze wire ring. (ibid. fig. 16, 7)
- 12) Iron rod, length 53 mm. (ibid. fig. 16, 8)
- 13) Iron wire bent into a square shape. (ibid. fig. 16, 9)
- 14) Two iron rings with square cross-section. (ibid. fig. 16, 10, 12)
- 15) Fragment of an iron ring with rectangular cross-section. (ibid. fig. 16, 13)
- 16) Fragments of at least six iron rings with round cross-section. (ibid. fig. 16, 11, 14–18)
- 17) Two bronze drum fibulae. (ibid. fig. 15, 1, 2)
- 18) Iron razor. (ibid. fig. 15, 3)
- 19) Point from an iron spearhead. (ibid. fig. 15, 4)
- 20) Large iron knife with decorated bone handle. (ibid. fig. 15, 5)
- 21) Bronze bowl with horizontal rim. The rim is decorated with embossed triangular motifs, and has riveted discs decorated

with dot-and-circle motifs; there were originally small rings riveted to the lower side of the rim. (ibid. fig. 14, 1)

22) Two pottery vessels. (ibid. figs 12, 2; 14, 2)

23) Pig bones.

Museum: Prähistorische Staatssammlung, München (wagon parts: inv. nos 1977, 1294–1299).

119 Hohenfels, 'Haidensbuch', tumulus II

(Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)

References: Reinecke 1901, 59; Weber 1902, 53; Torbrügge 1979, 315–316. Unpublished manuscript by F. Birkner, dated ca. 1908, in the Prähistorische Staatssammlung, München ('Bayerische Funde im Museum für Völkerkunde, vorgeschichtliche Abteilung, Berlin. Kopie des Berliner Inventars').

Description: These finds were acquired from A. Nagel in 1898. The tumulus apparently contained three skeletons. On the right side of the middle skeleton was a small pottery bowl, on the left side an iron sword. Iron tyres were found lying over the skeleton; remains of four ribbed iron nave-caps, two iron nave-neck sheathings, a square piece of iron sheet with nails at each corner, a (?) knife-like fragment and a small fragment of an iron fibula were also found. Of these finds, only one tyre fragment can be found in the Museum für Ur- und Frühgeschichte, East Berlin.

The catalogue of finds is partly taken from the Birkner manuscript (Fol. 46–47: IIc. 3437).

Finds:

- 1) Iron tyre fragments, of which one survives. The tyre is 16 mm wide with a domed cross-section. The nails are driven in every 100–140 mm and, according to the inventory book, were originally 80 mm long; however, because this measurement could refer to the distance from the top of the nail-head to the bottom of the bent-over nail, the penetration remains uncertain (presumably between 70 and 80 mm). The heads of the nails are subrectangular (ca. 14 × 8 mm) and countersunk. The curvature of the tyre shows an original diameter of about 800 mm. (Pl. 79A, 2–3)
- 2) Three iron fittings from the nave-heads, and fragments from a fourth. Height 35 mm, diameter 110 mm. (Pl. 79A, 6)
- 3) Two iron nave-neck sleeves, and further fragments. Length 60 mm, diameter 90 mm. (Pl. 79A, 5)
- 4) One square iron fitting with a nail in each corner. (Pl. 79A, 4)
- 5) Iron sword, hilt fragmentary. Length 615 mm. (Pl. 79A, 8)
- 6) Fragments of iron fittings, nails, knives and a fibula. (Possibly including Pl. 79A, 7)
- 7) Pottery bowl with omphalos, the inside and upper part of the outside are graphited. Height 40 mm. (Pl. 79A, 1)
- 8) Bones from a human skull.

Museum: Staatliche Museen, Museum für Ur- und Frühgeschichte, East Berlin (inv. no. IIc. 3437, a-1).

120 Illschwang – Gehrsricht, tumulus 2

(Kreis Amberg-Weizbach, Reg.-Bez. Oberpfalz)

References: Kossack 1954a, 151, no. 2 and 170, fig. 21A; Stroh 1975, 108, no. 1; Torbrügge 1979, 375–376. Unpublished archive material in the Naturhistorische Gesellschaft, Nürnberg, and in the Bayerisches Landesamt für Bodendenkmalpflege, Regensburg.

Description: Excavation of two tumuli, in a cemetery of at least 12 tumuli, was carried out in 1904. Torbrügge divided the finds

between two tumuli, relying on unpublished archive material in the Bayerisches Landesamt für Bodendenkmalpflege, Regensburg. The finds listed below apparently came from the wagon-grave.

Finds:

- 1) 25 fragments of iron tyres and 11 nail fragments. The tyres were ca. 23 mm wide and had a type III cross-section. Diameter of tyre ca. 650 mm. The heads of the nails were small and did not project over the level of the tyre surface. One tyre nail has wood grain running in different directions, showing there must have been a join between the inner and outer felloe rings at a penetration of 23–30 mm, or even less if the nail was hammered in crookedly (Pl. 77B, 3). (Pl. 77B, 3–5.7)
- 2) Fragmentary iron 'clamp', with two nails and longitudinal wood grain. (Pl. 77B, 8)
- 3) Seven small fragments of ribbed iron nave-caps. The profile of the nave-cap can be reconstructed, and also probably part of the nave-head ring. (Pl. 77B, 2)
- 4) Two reconstructed nave-necks. Each spool-shaped nave-neck consists of two bands of bronze sheet and one band of iron sheet. (Pl. 77B, 1.6)
- 5) Iron sword. (Torbrügge 1979, pl. 141, 18)
- 6) Five bronze toggles. (ibid. pl. 141, 13–17)
- 7) Four rein-rings. (ibid. pl. 141, 9–12)
- 8) Remains of a ring-footed tutulus. (ibid. pl. 141, 6)
- 9) Six pottery vessels, among which apparently two with cremated bones and one 'urn with a lid'. Lost.

Museum: Naturhistorische Gesellschaft, Nürnberg (inv. no. 7373).

121–2 No graves allocated.

123 Kitzingen – Repperndorf

(Kreis Kitzingen, Reg.-Bez. Unterfranken)

References: Wamser 1981a, 248; Wamser 1981c, 110–111. Unpublished archive material in the Bayerisches Landesamt für Bodendenkmalpflege, Würzburg.

Description: One of the tumuli in a group of three large tumuli was excavated by the Bayerisches Landesamt für Bodendenkmalpflege, Würzburg, in 1981. Plough damage had already reached the central chamber of the tumulus. The excavators could show that the original diameter of the tumulus was 40 m. In the centre was a roughly square stone core measuring ca. 10 × 10 m, with a height of 1.2 m. The stone core contained a wooden chamber, the external dimensions of which were ca. 5.68 × 3.9 m (Wamser 1981c, 111, fig. 96). The grave chamber stood on the old ground surface and was buried in a grave pit. The excavator (L. Wamser) thought that the chamber had been plundered in antiquity, judging from the disturbed appearance of the grave goods (Fig. 191).

Although the human bones were scattered over most of the grave chamber, Wamser thought that the inhumation had probably originally been positioned on the wagon. The personal goods of the inhumation included a bronze arched fibula (*Bogenfibel*) with crossbow construction (Fig. 191, P), a bear's claw (possibly an amulet), two small bronze spheres with iron shanks (which, according to Wamser, possibly came from a dagger scabbard), and remains of a bronze belt-sheet (the thigh bone in the NW part of the grave had fragments of bronze sheet adhering to it). Apart from the wagon, the grave also contained

remains of at least seven pottery vessels and three bronze rein-knobs.

Wagon remains were found in both the N and S parts of the grave, but the remains in the N were very badly disturbed. On the plan (Fig. 191), concentrations of iron tyre and nave fragments indicate the position of three wheels, and the tyre fragment in the NW could indicate the presence of the fourth. By the NE wheel was a linchpin, similar to the 'Bohemian' type (Fig. 191, Q), and a fragmentary bronze sheet band from the wagon-box. The S wheels are shown in a detailed plan (Fig. 192). By the SW wheel's nave was a linchpin with a crescent-shaped head (Fig. 192, L). There are also numerous remains of decorative bands from the wagon-box (Fig. 192, A–J), consisting of wood traces associated with bronze and iron sheet.

In Wamser's reconstruction of the wagon (Wamser 1981c, 110, fig. 95), the wagon-box is shown with a lower band of 'grid-shaped' bronze sheet decoration (Fig. 192, F, J) and an upper level of zig-zag bronze sheet decoration (Fig. 192, C, G, H). In his reconstruction, the top edges of the wagon-box sides seem to be covered with bronze sheet (presumably Fig. 192, A). On Wamser's reconstruction, the sides of the box measure ca. 14 mm in height, but the position of the decorative bronze sheet remnants may indicate higher sides, perhaps ca. 200 mm. Some of the decorative fittings are not included on Wamser's reconstruction (Fig. 192, B, D, E) and it is difficult to suggest their original position. They seem to be positioned at right-angles to the side walls, between the two looped iron rods (Fig. 192, M, N), and they could represent the remains of one of the ends of the wagon-box.

The sides of the wagon-box were provided with large iron nails which are seen associated with the decorative bronze bands on Fig. 192, G, H, J.

One of the iron tyre fragments is associated with a felloe-clamp, which is shown as a rectangular thickening by N on Fig. 192.

Comments: The author warmly thanks Dr L. Wamser for permission to publish here the finds from his excavation.

Finds:

- 1) The iron tyres were flat in cross-section and ca. 31 mm wide. The nails were spaced 110–160 mm apart and had large roughly square heads of type E (17–22 × 21–26 mm). One nail is completely preserved and shows a felloe thickness of 56 mm; this nail also bears horizontal wood grain. One tyre fragment shows a join where the tyre was hammer-welded together. According to the surviving fragments, the tyres were about 850 mm in diameter. (Fig. 192, K; Pl. 79B, 5–6)
- 2) Remains of a felloe-clamp were found by one tyre (Fig. 192, N). The ends were secured by two or three nails and show horizontal wood grain. (Pl. 79B, 1–4)
- 3) The naves were provided with nave-head and nave-stock rings, of type Repperndorf. The nave-head fittings are 110–122 mm in diameter, made from a simple nave-cap with an axle-channel 60–64 mm in diameter, covered by a broad band of iron sheet 56–60 mm wide (Pl. 80, 1–2). The nave-stock rings have an external diameter of about 166 mm and an internal diameter of ca. 139 mm. They are each made from a single iron sheet band and vary in width from 30–39 mm (Pl. 80, 3–4). (Pl. 80)
- 4) Iron linchpin, similar to the 'Bohemian' type. The linchpin could have carried pendent iron rings; on the other hand, the iron rings could have belonged to one of the looped iron rods described below (Pl. 81, 7). The linchpin was found by Q on Fig. 191. (Pl. 81, 6–7)

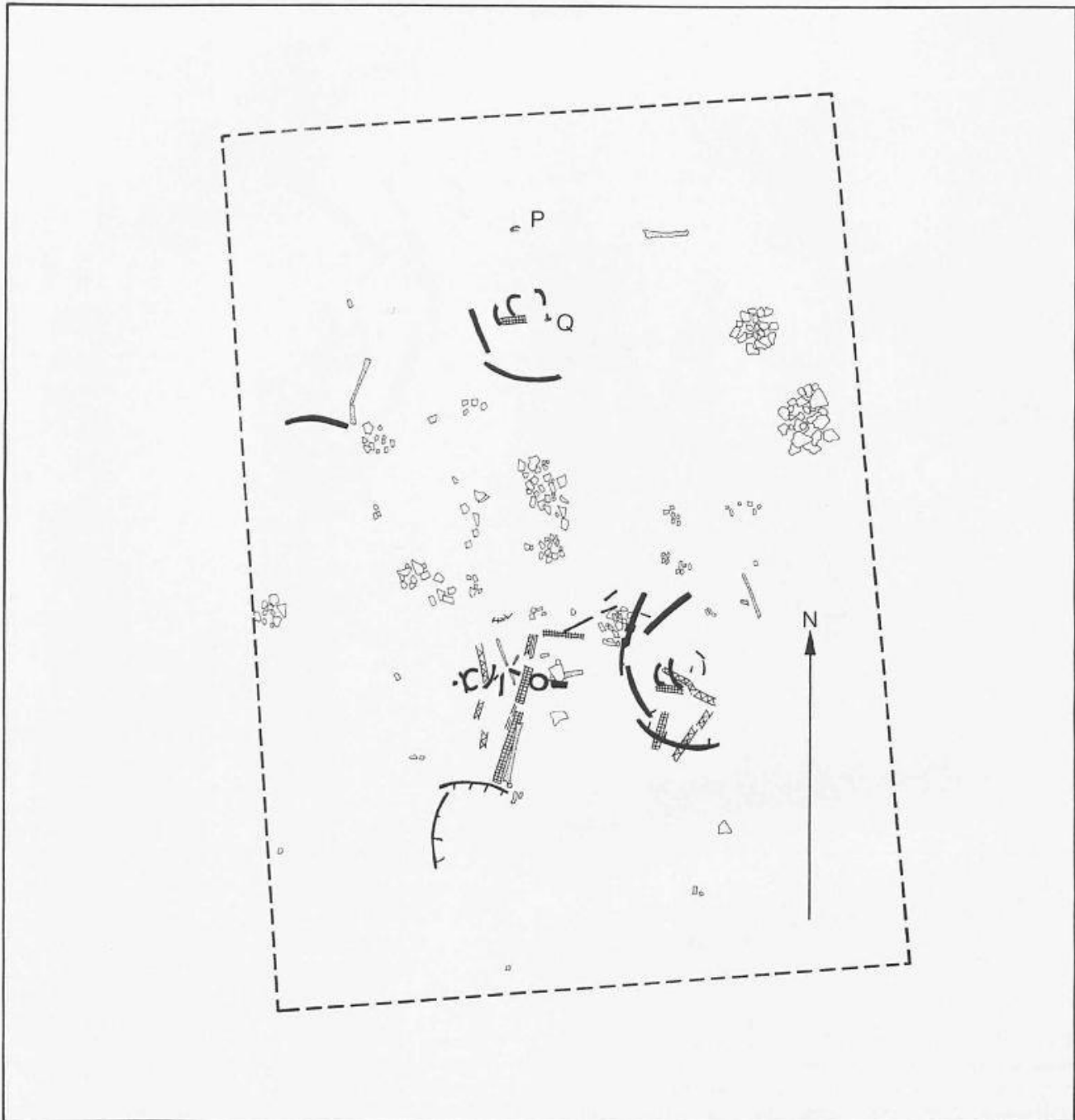


Fig. 191 Kitzingen-Repperndorf: plan of the grave chamber. P Fibula (Pl. 81, 14); Q Linchpin (Pl. 81, 6-7).
 – Iron: black; human bone: stippled; bronze sheet: linear; pottery sherds: white. – Scale 1:40.

5) Iron linchpin with crescent-shaped head. Found by L on Fig. 192. (Pl. 81, 1)

6) Wagon-box decoration consisting of wood traces, and bronze and iron sheet. The drawings listed below were copied from life-size drawings of the finds *in situ* by L. Wamser. The positions of the wagon-box decorations are shown on Fig. 192.

A) bronze band 17.5 mm wide, secured by iron nails. (Pl. 81, 18)

B) ladder-shaped arrangement of bronze bands secured by iron nails, original width 43 mm. (Pl. 81, 22)

C) zig-zag arrangement of bronze bands secured by iron nails, original width 31 mm. (Pl. 81, 23)

D) grid-shaped arrangement of bronze sheet bands secured by iron nails. This was originally found on a rounded fragment of wood. (Pl. 81, 25)

E) iron band, ca. 24 mm wide. The fragments of this strip indicate an original length of at least 362 mm. (Pl. 81, 28)

F) grid-shaped arrangement of bronze bands, secured by iron nails. Width 49 mm. (Pl. 81, 13)

G) zig-zag arrangement of bronze bands, secured by iron nails. Width 34 mm. (Pl. 81, 24)

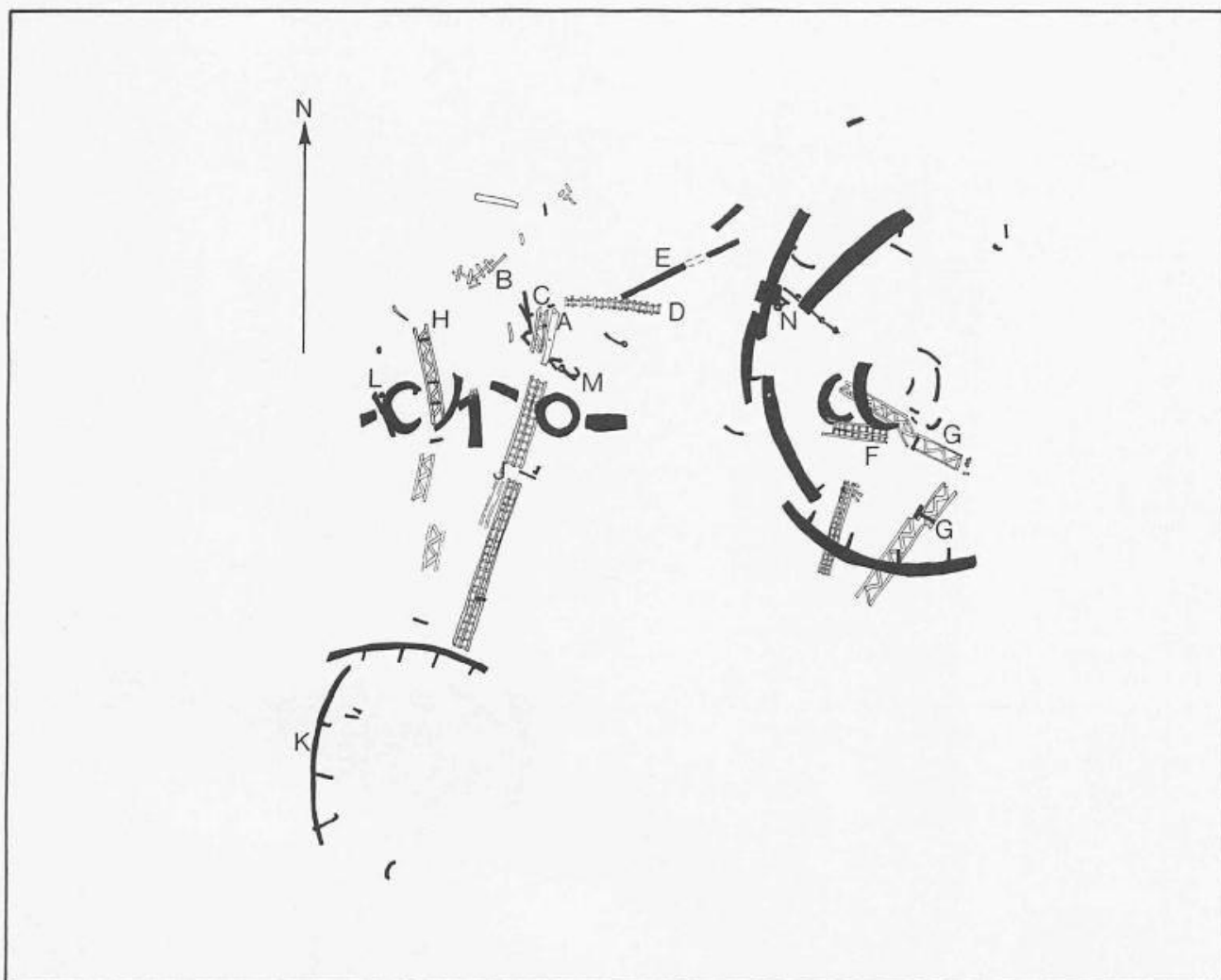


Fig. 192 Kitzingen-Repperndorf, detail of the south end of the grave chamber. – Wagon-box decoration: A (Pl. 81, 18); B (Pl. 81, 22); C (Pl. 81, 23); D (Pl. 81, 25); E (Pl. 81, 28); F (Pl. 81, 13); G (Pl. 81, 24); H (Pl. 81, 26); J (Pl. 81, 29–30). – Iron wagon fittings: K (tyre fragment on Pl. 79B, 6); L (linchpin Pl. 81, 1); M–N (looped iron rods Pl. 81, 2–5.8). – Iron: black; bronze sheet: linear. – Scale 1:20.

H) zig-zag arrangement of bronze bands secured by iron nails. Width 35 mm. (Pl. 81, 26)

J) grid-shaped arrangement of bronze bands fastened by iron nails. The transverse bands were both closely and less closely spaced. Width 39 mm. (Pl. 81, 29–30)

Numerous small fragments of wagon-box decoration survive, although most of the fragments are too small to be able to distinguish the original decorative type. One surviving iron nail probably also comes from the wagon-box sides (Pl. 81, 27)

- 7) At least three fragmentary looped iron rods, originally 142 mm long (Fig. 192, M.N). Each rod is square in cross-section and has a loop at each end; both also have a perforation in the shaft. On one of the examples, the shaft perforation still holds an iron 'omega-clip', which held a pair of iron rings. The end-loops of the rods held large iron 'omega-clips' and iron rings. On one of the rods, the large 'omega-clips' bear transverse wood grain, which shows that they were originally embedded in wood. (Pl. 81, 2–5.8)
- 8) Three bronze hemispherical rein-knobs with single loops on the rear side. (Pl. 81, 15–17)

9) Bronze arched fibula (*Bogenfibel*) with crossbow spring, length 62 mm. The foot is bent up and terminates in a profiled knob. (Pl. 81, 14)

- 10) Remains of a bronze belt-sheet. There survive: two hemispherical bronze bosses with spherical-headed rivets; a lump of earth bearing the impression of a row of impressed concentric circles and a row of small dents; a small fragment of bronze sheet also survives on the lump of earth (compare with Kilian-Dirlmeier 1972, nos 262–3, 271, 312–3 and 626) (Pl. 81, 9–11). Another fragment may also belong to the bronze belt-sheet, it consists of two pieces of bronze sheet held together by two small rivets (Pl. 81, 12).

11) Two small bronze spheres with iron shafts. (Pl. 81, 19–20)

12) One bear's claw. (Pl. 81, 21)

- 13) Conical-necked vessel with painted decoration. Much of the decoration has been lost (rough stippling). The painted decoration was executed in red (dark stippling) on a white background (white on the illustration). The conical neck and the outside of the rim are painted red. The belly of the vessel is also painted red, in a zig-zag or triangular pattern. One of the sherds from the lower part of the belly may bear

traces of graphite painting (stripes?). Two sherds, from the neck and from the base, are perforated. (Pl. 82, 1)

- 14) Vertical-necked bowl with painted graphite decoration. (Pl. 82, 2)
- 15) Two grey-black cups, one with painted graphite decoration. (Pl. 82, 3–4)
- 16) Two grey-black bowls. (Pl. 82, 5–6)
- 17) Two large grey-black jar-shaped vessels; the lower part of each vessel is roughened. (Pl. 82, 7–8)

Present location: Bayerisches Landesamt für Denkmalpflege, Würzburg.

124 Leinach – Oberleinach

(Kreis Würzburg, Reg.-Bez. Unterfranken)

References: Reinecke 1898, 180; Müller-Karpe 1953, 56–59. Unpublished manuscript by P. Reinecke, undated, in the Bayerisches Landesamt für Denkmalpflege, Würzburg, and letters in the Prähistorische Staatssammlung, München, dated 1897 and 1899.

Description: These finds were discovered during ploughing in 1897. According to the farmer, S. Ohrlein, a large stone tumulus had stood in this position in the middle of the last century. The first finds were of bones and spearheads; further excavations uncovered six to eight skeletons, lying close together. Some of the bones were later studied in the RGZM, Mainz, and this number of skeletons was confirmed. The find also included numerous items of jewellery (ear-rings, arm-rings, bronze belt-sheet etc.), seven iron spearheads, two iron knives, as well as iron wagon parts.

Comments: Owing to the number of burials, as well as the discovery of two iron knives and seven iron spearheads, it is certain that this cannot be considered a closed assemblage. Müller-Karpe thought it was a mass grave, with contemporary burials; it is more likely that the tumulus contained primary and secondary graves, which were not distinguished by the excavator.

Among Reinecke's unpublished notes on this grave is a photograph of one reconstructed tyre and one complete ring from the nave fittings. The ring has not survived, but the photograph is of use in reconstructing the original shape of the nave.

Finds:

- 1) Two fragments of iron tyres, average width 26 mm, estimated diameter 760 mm. The nails have large globular or oval heads of type E, which were hammered in every 190–220 mm. The nails preserve wood grain which is always horizontal. (Pl. 78, 1)
- 2) Remains of iron nave fittings of type Repperndorf. The nave sheathing consists of simple iron nave-caps which have an external diameter of 120 mm and an axle-channel diameter of 58 mm (Pl. 78, 5–6), nave-stock sheathing (Pl. 78, 11), and nave-head sheathing (Pl. 78, 12–15). (Pl. 78, 5–6, 11–15)
- 3) Remains of three iron rods with spherical heads and collars (maximum length of shaft preserved is 126 mm). Two of the shafts preserve wood grain. (Pl. 78, 2–4)
- 4) Small iron nail, possibly from the nave. (Pl. 78, 10)
- 5) Four fragments of iron sheet, probably from the naves.
- 6) One fragmentary iron (?)felloe-clamp. (Pl. 78, 7)
- 7) Two iron discs with remains of nails, diameter 22–23 mm. One of the discs preserves wood grain. (Pl. 78, 8–9)

- 8) The tumulus also contained: one bronze belt-sheet; one bronze arm-ring; 13 complete or fragmentary bronze sheet ear-rings; seven agate beads; one bronze fragment with grooves for (?)coral inlay; seven iron spearheads; two fragmentary iron knives; fragmentary iron ring. (Müller-Karpe 1953, 57, fig. 1, 1–18.23.28–36)

Museum: Prähistorische Staatssammlung, München (wagon remains: inv. nos 1897, 175–177 and 179, b.d.).

125 Leipheim, 'Waldteil Justing-West', tumulus 14

(Kreis Günzburg, Reg.-Bez. Schwaben)

References: Richter 1890, 236f.; Weber 1892, 134; Richter 1893, 230; Auer 1937, 110; Krämer 1952, 165–167; Stroh 1952, 20–22.42.43; Kossack 1959, 155.

Description: About 17 tumuli, in a group of about 45 tumuli, were excavated by the Historischer Verein für Schwaben und Neuburg between 1888 and 1893. Tumulus X was described as being 1.7 m high and 18 m in diameter. The finds included two bronze ankle-rings, numerous fragments of iron tyres and horse-gear, eight bronze rein-knobs, and numerous decorated sherds.

In 1951 the most N of the tumuli (tumulus 14) was partly destroyed by forestry work and subsequently excavated by the Bayerisches Landesamt für Denkmalpflege. A new plan of the tumulus group shows this flattened tumulus with a diameter of about 40 m, which would make it one of the largest in the cemetery. It was found that the tumulus had already been excavated – and it was presumably one of the 17 excavated between 1888 and 1893. The wooden grave chamber was orientated N-S and measured 4.8 × 4.1 m (Fig. 193). In the NW part of the chamber were iron remains of a wagon (tyres and nave fittings). A pile of cremation, 700 mm long, was found between the wheels, and probably originally lay on the wagon. Near the SW wheels were six spearheads, pointing to the S. In the SW corner were a pottery vessel and some remains of iron horse-gear; further pottery remains were found in the SE and NE corners.

Comments: The old excavations had clearly removed the E wheels of the wagon, as well as most of the pottery. It seems highly likely that we are concerned with the same grave, excavated in 1889 (tumulus X) and re-excavated in 1951 (tumulus 14).

Finds:

- 1) At least 90 fragments of iron tyres, original width ca. 25 mm. Some of the tyre nails show diagonal wood grain (Pl. 83A, 9.11). One fragment has a fragmentary iron felloe-clamp preserved (Pl. 83A, 6). An important fragment has well-preserved wood remains displaying a join between two felloe segments. The angle of the wood grain on one side of the join can be measured (ca. 70°), which shows an estimated 8–10 segments (8 being more likely than 10). The tyre nails were hammered in every 80–90 mm. (Pl. 83A, 3–6.9–11)
- 2) Two iron rod fragments with looped ends and attached rings. The better preserved fragment measures 84 mm in length and seems too long for a fragmentary horse bit. (Pl. 83A, 7–8)
- 3) Fragmentary iron nave-neck and nave-head sheathings of Breitenbronn naves. (Pl. 83A, 1–2)
- 4) Remains of iron horse bits. (Kossack 1959, pl. 35, 12–13)
- 5) Fragmentary iron toggles. (ibid. pl. 35, 8–9.11)
- 6) One long spearhead and five shorter spearheads, all of iron. (ibid. pl. 35, 15–16)

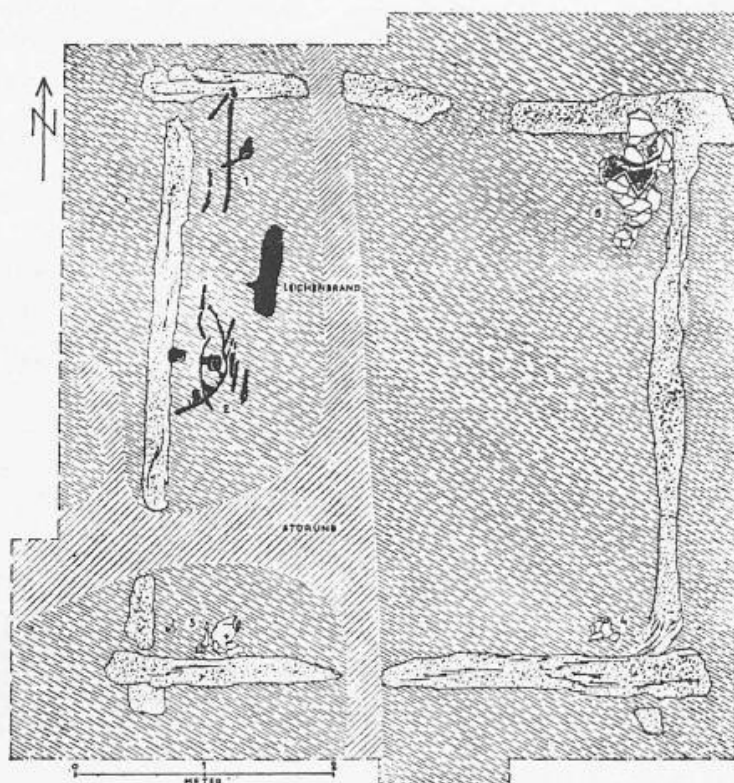


Fig. 193 Leipzig, 'Justing-West', tumulus 14: plan of the grave chamber (after Kossack 1959).
— Scale 1:60.

- 7) Eight fragmentary ring-footed rein-knobs. (ibid. pl. 35, 14)
- 8) Two bronze ankle-rings, twisted construction. (ibid. pl. 35, 17)
- 9) At least four pottery vessels, probably originally many more. (ibid. pl. 35, 18–21)

Museum: Finds from the 1951 excavations are in the Museum Günzburg (inv. no. 1959/1. 1a–c). Some of these finds, particularly the nave fittings, were not available for study. The finds from the 1889 excavations are in the Römisches Museum, Augsburg (inv. nos 305, b1/2 and 305, 1–8.11–50).

126A Lupburg – Gottesberg, tumulus 1 (Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)

References: Scheidemandel 1888, 2–3; Scheidemandel 1902, 14–16; Kossack 1954a, 152; Torbrügge 1979, 294–296.

Description: In this cemetery of six to seven tumuli, five tumuli were excavated by Scheidemandel in 1887. Tumulus 1 had already been disturbed in 1886 when a worker robbed stones from the tumulus for building purposes, and in the process removed some of the pottery goods. The tumulus was 55 paces in circumference and 1.5 m high (probably the largest tumulus in the cemetery). At a depth of 1.3 m, Scheidemandel found a burnt layer, 1.5 m in diameter, in the centre of the tumulus. On the N side of the burnt layer was a large quantity of iron tyres. Among the tyres were an iron sword, two trident-shaped linchpins and a small iron rod. To the W were five small embossed bronze sheets, each originally fastened by four nails. About 20 nails were found. In the same place was an iron horse

bit and animal bones and teeth. E of the burnt layer were the pottery vessels, probably seven in number.

Comments: Scheidemandel (1902), in his description of the tumulus, mentions the pottery vessels on his pl. 6, 6.8–14. In the description of his plates, however, pl. 6, 7 is also described as coming from tumulus 1. Torbrügge has mistakenly assigned a tyre fragment from tumulus 3 to this grave (Torbrügge 1979, pl. 61, 6). Likewise he assigns a tyre fragment from tumulus 1 to tumulus 3 (ibid. pl. 62, 1).

Finds:

- 1) Six fragments of type Ia iron tyres, width 22 mm. The tyres are furnished with long-headed nails (type A) which were hammered in every 45–65 mm. The longest penetration of a tyre nail is 65.6 mm. The tyre nails often preserve diagonal wood grain (in one case to a penetration of 46 mm). (Pl. 84A, 6.10–13)
- 2) Fragments of two linchpins (Pl. 84A, 1–2.4–5). Further fragments are not actually assigned to tumulus 1 in the inventory book, but nevertheless must belong. One fragment consists of the lower shank of a third linchpin (Pl. 84A, 9). (Pl. 84A, 1–5.7–9)
- 3) 13 fragments of embossed bronze sheet yoke-bands. The fragments represent more than five full bands. The bands were embossed with linear, point-boss and ring-boss ornament. They were fastened to a (?wooden) base with small bronze nails, of which the excavator found about twenty. (Pl. 83B)
- 4) Iron sword. (Torbrügge 1979, pl. 60, 1)
- 5) Iron horse bit. (ibid. pl. 60, 4)

- 6) Remains of seven pottery vessels. (ibid. pl. 60, 2,3; Scheidemandel 1902, pl. 6, 6–14)

Museum: Prähistorische Staatssammlung, München (wagon parts: inv. no. 1888, 63, 72, 91–2, 94 and 96–98).

126B Lupburg – Gottesberg, tumulus 3

(Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)

References: Scheidemandel 1888, 2–3; Scheidemandel 1902, 14–16; Kossack 1954a, 152; Torbrügge 1979, 294–296. Unpublished manuscript by H. Scheidemandel, dated 1901, in the Prähistorische Staatssammlung, München ('Grabhügel bei Eggenthalmühle').

Description: Tumulus cemetery of six to seven tumuli. Tumulus 3 was excavated by Scheidemandel in 1887, and was 35 paces in circumference and 1.4 m high. The tumulus was oval in shape and built of stone. In the E side of the grave, at a depth of 800 mm, were six pottery vessels. To the W, at the same depth, were parts of a human pelvis and N of this a single fragment of iron tyre. On the natural soil were two horse bits and a bone toggle.

Comments: In his description of this tumulus, Scheidemandel (1902) mentions the objects on his plates pl. 2, 6–7.9 and pl. 5, 1.4–6. In his 'Tafelerklärung' (1902, 28–30), however, he also describes pl. 2, 8.10–12 and pl. 5, 2–3 as coming from this tumulus. These other finds will be accepted as belonging to tumulus 3, particularly because they are also assigned to this tumulus in a manuscript by Scheidemandel. Torbrügge has mistakenly assigned a tyre fragment from tumulus 1 to this grave (Torbrügge 1979, pl. 62, 1). Likewise he assigns the tyre fragment from tumulus 3 to tumulus 1 (ibid. pl. 61, 6).

Finds:

- 1) One type III tyre fragment, ca. 18 mm wide, and five tyre nails. The tyre nails show the height of the felloe to have been ca. 68 mm, and they bear horizontal wood grain. The nails are driven in every 117–119 mm. The nail heads (type B) are subrectangular (ca. 14 × 8 mm) and protrude slightly above the surface of the tyre. (Pl. 84B; Scheidemandel 1902, pl. 2, 7)
- 2) Two iron horse bits. (Torbrügge 1979, pl. 62, 7–8; Scheidemandel 1902, pl. 2, 9)
- 3) Bone toggle. (Torbrügge 1979, pl. 62, 4; Scheidemandel 1902, pl. 2, 6)
- 4) Remains of six pottery vessels (Torbrügge 1979, pl. 62, 6; Scheidemandel 1902, pl. 5, 1–6)
- 5) Two rings of spiral bronze wire. (Torbrügge 1979, pl. 62, 2–3; Scheidemandel 1902, pl. 2, 12)
- 6) Fragment of a bronze 'Vierpassfibel'. (Torbrügge 1979, pl. 62, 5; Scheidemandel 1902, pl. 2, 11)
- 7) Small bronze ring. (Scheidemandel 1902, pl. 2, 10)

Museum: Prähistorische Staatssammlung, München (wagon parts: inv. no. 1888, 62).

127 Münsing – Buchsee, tumulus 1 of 1907

(Kreis Bad Tölz-Wolfratshausen, Reg.-Bez. Oberbayern)

References: Weber 1908, 52; Kossack 1959, 247. Unpublished letter by Lippold, dated 19th June 1908, in the Prähistorische Staatssammlung, München.

Description: This cemetery contained 37 tumuli. Tumulus 1 was probably one of the largest in the cemetery and measured 16.5 m in diameter and 2.35 m in height; about a third of the tumulus

was destroyed before excavation. The grave was found almost on the natural soil, in the centre, at the base of the tumulus (Fig. 194). The cremation was collected within a square arrangement of stones (350 × 380 mm). N and S of this were the four iron tyres of the wagon. The NE, SW, and SE tyres had fallen flat on the floor of the grave, while the NW tyre had obviously been crushed when the roof of the grave chamber caved in. The tyres were 25 mm wide; apart from the tyres there were a few remains of spokes, a nave, and some nails. The diameter of the tyres was 740 mm. Between the four wheels was a long object (length ca. 900 mm) which Weber interpreted as an axle but, as it is positioned in a N-S direction, it would better correspond to the perch. By the S wheels were nine bronze and two iron rings, 20–36 mm in diameter. W of the cremation were two bronze rings. E of the NE wheel were five pottery vessels (Fig. 194).

The metal and wooden finds were sent to the Römisch-Germanisches Zentralmuseum in Mainz for restoration. The RGZM restored the finds and returned them with a letter describing the objects: 'iron and wooden remains of the wheels with remains of spokes, nave fittings, remains of an articulation between the front and back of the wagon, wooden parts of the Wagensessel, 'Verbandstücke aus Eisen, Bronze und Holz unter dem Wagensitz', six sharply profiled bronze rings, one larger and two smaller bronze rings, two very small bronze rings, wooden remains bearing impressions of the rings, and three iron rings' (unpublished letter by Lippold). The letter also mentioned some of the other objects from Weber's excavations.

Finds:

- 1) Iron and wooden wagon parts. The tyres are supposed to have had a width of 25 mm and a diameter of 740 mm. Lost.
- 2) Six profiled bronze rings. Lost.
- 3) One larger and two smaller bronze rings. Lost.
- 4) Two very small bronze rings. Lost.
- 5) Wooden remains bearing impressions of rings. Lost.
- 6) Three iron rings. Lost.
- 7) Sherds of a large conical-necked vessel (*Kegelhalsgefäß*). The diameter of the rim is 350 mm, and of the base 220 mm. The outside of the vessel is painted a dark cherry red, and the neck bears graphite paint. On the shoulder are vertical graphite stripes. (Pl. 85A, 3)
- 8) Conical-necked bowl, rim diameter 170 mm. The outside of the vessel is painted red; the neck bears graphite paint, and the shoulder bears faint traces of vertical graphite stripes. (Pl. 85A, 2)
- 9) Large vessel, height 240 mm, largest diameter 380 mm, with red and black striped painting. Lost.
- 10) Small conical-necked cup, height 86 mm, greatest diameter 105 mm. The inside and outside of the neck and the handle carry graphite painting, the rest of the vessel is unpainted (brownish-red colour). The shoulder is decorated with incised garlands and small indentations. (Pl. 85A, 1)
- 11) Small conical-necked handled cup, brownish red, outside of vessel and inside of neck graphited, on the shoulder incised hatched triangles, with indentations at their apexes. (Kossack 1959, pl. 86, 2)

Museum: Prähistorische Staatssammlung, München (inv. no. 1908, 28–34).

128 Nennslingen – Wengen, tumulus 1

(Kreis Weissenburg-Gunzenhausen, Reg.-Bez. Mittelfranken)

References: Ziegler 1896, 9.

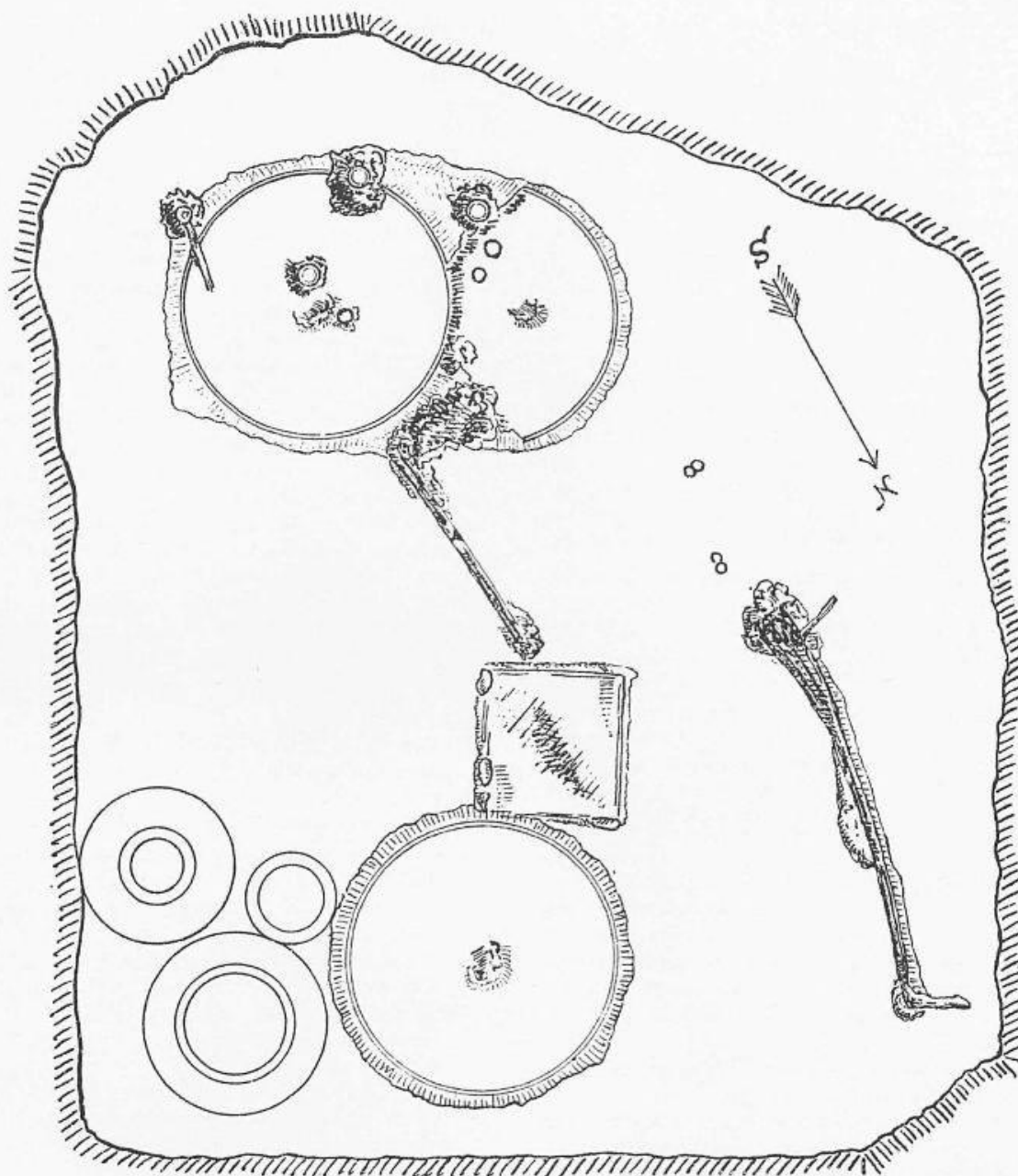


Fig. 194 Münsing-Buchsee, tumulus 1 of 1907: plan of the wagon-grave (after Weber 1908). – Scale 1:20.

Description: A group of four tumuli was excavated by F. Ziegler in 1892 and 1893. Tumulus 1 had a stone core. The burial was found at a depth of 1 m, it was an inhumation orientated S-N (presumably head to the S and feet to the N). By the neck were two boat-shaped fibulae. To the E lay various iron fragments and nails and a fragmentary iron horse bit with two broken iron rings. To the W were sherds and charcoal.

These grave finds have recently been published by M. Hoppe (1986).

Finds:

- 1) Numerous iron tyre fragments, about 30 mm wide, with a type VII cross-section. No nails were visible. (Pl. 85B, 1.3.5–6.8)

- 2) Fragmentary iron horse bit, surviving length 74.5 mm. (Pl. 85B, 4)
- 3) Two iron rings, originally belonging to the horse bit. Lost.
- 4) Point of an iron knife. (Pl. 85B, 2)
- 5) Fragmentary bronze boat-shaped fibula. The bow is decorated with two groups of four engraved transverse lines, and then longitudinal lines. (Pl. 85B, 7)
- 6) Boat-shaped fibula. Lost.
- 7) Sherds. Lost.

Museum: Iron tyres: Stadtmuseum Gunzenhausen (inv. no. 621). Associated finds: Germanisches Nationalmuseum, Nürnberg (inv. no. F.G. 1945).

129 Neukirchen bei Sulzbach-Rosenberg – Gaisheim, tumulus 6

(Kreis Amberg-Sulzbach, Reg.-Bez. Oberpfalz)

References: Forster 1913, 107–118; Torbrügge 1979, 382–385 (with further literature). Unpublished manuscripts in the Naturhistorische Gesellschaft, Nürnberg.

Description: This tumulus cemetery contained at least eight tumuli, and tumulus 6 was excavated in 1906 and 1907. A plan of the cemetery shows tumulus 6 was the largest tumulus in the cemetery, and the furthest to the N (Forster 1913, 108). Tumulus 6 measured 7.3 m(N-S) × 8.2 m(W-E). Roughly in the centre of the tumulus were the remains of a central grave, probably originally housed in a wooden chamber which had not, however, been preserved. Huber, the excavator, drew a plan of the grave, and made some notes which are kept in the Naturhistorische Gesellschaft, Nürnberg (Fig. 195). To the E was a row of at least six vessels, orientated roughly N-S (Fig. 195, 2–5.8.11). In the SW corner were 'two horse bits, bronze rings, and bronze knobs' (Fig. 195, 1). In the NW part of the grave were numerous finds, including an area (marked with a broken line on the plan) measuring roughly 3 × 1.4 m: 'a layer of small bronze knobs, which were fixed as decoration onto a piece of textile'. 'Most of the other finds: sword, antler hammer, *Nadelbüchse*, spearhead, wooden remains and decorated pieces of leather, lay in this area'. Indeed, on the plan some of the finds are more precisely located (Fig. 195, 14: sword and chape, alongside lay the *Nadelbüchse* with five pins and with two more pins close by; Fig. 195, 13: whetstone; Fig. 195, 7: ring; Fig. 195, 10: leather decorated with bronze knobs; Fig. 195, 9: bronze ring). To the W of this area were remains of a yoke ('pieces of wood decorated with bronze knobs': Fig. 195, 6).

In the NW corner of the grave was a complicated construction measuring 750 × 220 mm (Fig. 195, A). The excavator made a detailed drawing of this object (Fig. 196). The S side was formed by a straight wooden strip (Fig. 196, e); the N side, in contrast, curved in an 'S'-shape and was formed by a band of bronze sheet (Fig. 196, b), on which were hung iron pendants (Figs 74, 2–4; 196, a). From the SE corner ran a piece of wood extending towards the S (Fig. 196, f). The upper surface of the object was decorated with square bronze applications (Figs 74, 5–10; 196, d), as well as six pairs of openwork bronze plaques (Figs 74, 1; 196, c). Considering the lay out of the grave, with the horse harness at the SW of the grave, and the yoke ('pieces of wood decorated with bronze knobs': Torbrügge 1979, pl. 160, 19–25) in the middle of the W side (Fig. 195, 6), the interpretation of the object positioned in the NW of the grave (Fig. 195, A), is of interest: this is where one would normally expect remains of a vehicle to be found.

Finally, at point B on Fig. 195, skull bones were found. These probably had nothing to do with the central grave, and possibly represent a secondary inhumation.

Comments: The grave contents are probably mixed to some extent. For example, the bronze melon-armband and spear do not seem appropriate to this grave, and may come from a secondary inhumation, possibly indicated by the skull bones (Fig. 195, B).

Finds:

- 1) Iron sword. (Torbrügge 1979, pl. 159, 6)
- 2) Two iron horse bits, each with a large ring at one end and a leaf-shaped rein-hook in the other. (ibid. pl. 161, 19)
- 3) Six iron rings. (ibid. pl. 161, 24–26 and pl. 149, 2–5)
- 4) Four iron cheek-pieces. (ibid. pl. 161, 20–23)

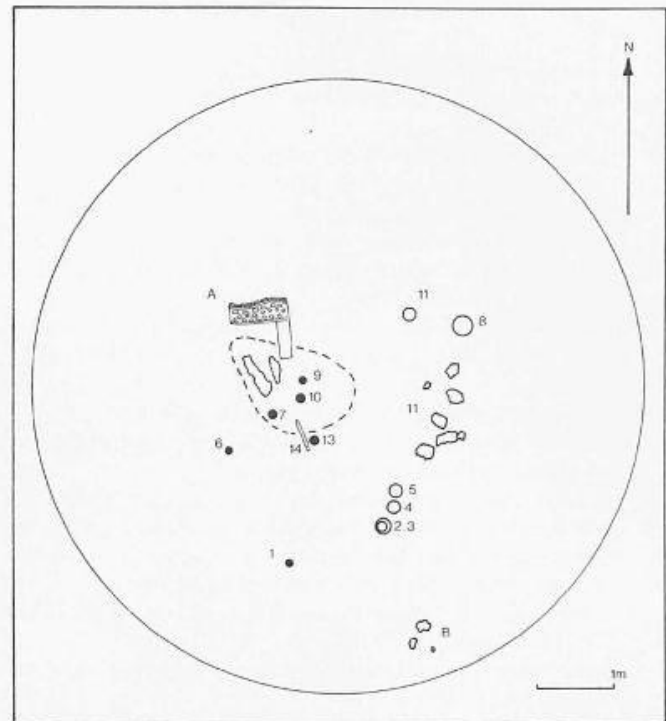


Fig. 195 Neukirchen-Gaisheim, tumulus 6, plan of the excavated area: 1 Two horse bits, bronze rings, bronze knobs; 2–5 Pottery vessels; 6 Pieces of wood decorated with bronze knobs (yoke); 7 Ring; 8 Pottery vessel; 9 Bronze ring; 10 Leather decorated with bronze knobs; 11 Sherd scatter; 13 Whetstone; 14 Iron sword, antler hammer, bronze pins; A decorated wooden object (Fig. 196); B Skull bones. – Scale 1:100.

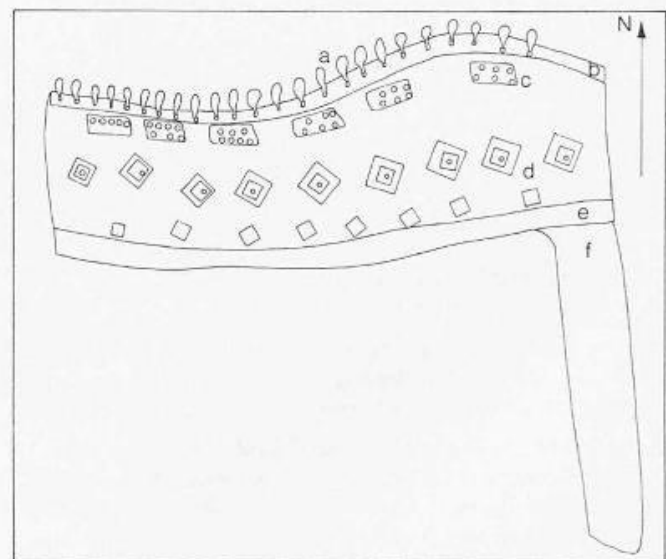


Fig. 196 Neukirchen-Gaisheim, tumulus 6, detail drawing of the object in the north-west corner of the grave. – Not to scale.

- 5) Two bronze ring-toggles, with leather remains. (ibid. pl. 160, 3.4)
- 6) Three bronze rings with leather remains. (ibid. pl. 160, 1–2.5)
- 7) Remains of plaited leather. (ibid. pl. 160, 6)
- 8) Leather rein with decorative bronze knobs. (ibid. pl. 160, 13–18)
- 9) 11 bronze ring-footed knobs. (ibid. pl. 161, 16–18)
- 10) Three bronze profiled rings. (ibid. pl. 161, 13–15)
- 11) Remains of a wooden yoke, decorated with small bronze knobs with paired spikes. (ibid. pl. 160, 19–25)
- 12) 12 fragmentary square-shaped bronze frames. (Fig. 74, 5–10; ibid. pl. 160, 7–12)
- 13) Remains of wide leather straps, decorated with smaller and larger bronze sheet knobs with paired spikes. (ibid. pl. 160, 26–28)
- 14) Two bronze plaques with rectangular openwork decoration; the upper two corners have loops, through which an iron rod is threaded. (ibid. pl. 162, 1–2)
- 15) Seven bronze 'Jochschnallen' with circular and diamond-shaped openwork decoration; these were adapted for use as wagon ornaments. The backs of the upper sides bear rectangular loops, through which iron wire loops are passed to fasten the 'Jochschnallen' to a length of thick iron wire. (Fig. 74, 1; ibid. pl. 162, 4.7–12)
- 16) Iron pendants, fixed to a length of iron wire. (Fig. 74, 2–4; ibid. pl. 149, 6–11)
- 17) 15 bronze rings. (ibid. pl. 161, 1–12)
- 18) Fragmentary bronze sheet yoke-bands, provided with nails. One fragment bears embossed decoration of concentric circles. (ibid. pl. 162, 5–6)
- 19) Bronze *Nadelbüchse* with five bronze pins. (including Forster 1913, pl. 31, 51–52; Torbrügge 1979, pl. 156, 6.8)
- 20) Antler hammer. (ibid. pl. 163, 2)
- 21) Whetstone. (ibid. pl. 163, 1)
- 22) Remains of birch bark.
- 23) At least eight pottery vessels. (ibid. pls 158, 1–2; 159, 1; possibly also pl. 157, 20 and pl. 159, 5)

Not definitely associated:

- 24) Remains of a bronze 'melon' armband. (Torbrügge 1979, pl. 162, 3)
- 25) Iron spearhead. (ibid. pl. 159, 2)
- 26) Iron spear ferrule. (ibid. pl. 159, 3)
- 27) Iron knife. (ibid. pl. 159, 4)

Museum: Naturhistorische Gesellschaft, Nürnberg.

130 Niederrieden, 'Lehbühel'

(Kreis Unterallgäu, Reg.-Bez. Schwaben)

References: Eberl 1933, 67–71; Kossack 1959, 165. Unpublished manuscript, undated, in the Bayerisches Landesamt für Denkmalpflege, Augsburg ('Fundbuch der Memminger Sammlung').

Description: Apparently this tumulus stood alone (dimensions in 1882, 17.7 × 9.6 m, but originally a diameter of ca. 17.7 m, height 2.3 m). It was excavated in 1882. At the base of the tumulus, the excavator found the 'iron-clad fragments of a long, rod-shaped object, possibly a wagon pole'. Also about six(?) small iron decorative knobs. The find also included a large iron disc, at least 140 mm in diameter, and two fragments of a large iron boss, at least 100 mm in diameter, with a horizontal rim 10 mm wide. Eberl mentions a few more iron fragments and at least five sherds.

Finds:

- 1) Fragments of iron nave fittings (Pl. 86A, 1–6). The nave seems to have been related to the Cannstatt type, but without ribbed decoration. However, one fragment bears a row of four small bosses (Pl. 86A, 4).
- 2) One iron nail. (Pl. 86A, 14)
- 3) Small bronze cylindrical fragment. Part of the fragment is hollow. (Pl. 86A, 7)
- 4) Fragment of an iron socket with a discoidal terminal. Some fragments of iron sheet are rusted onto the socket. (Pl. 86A, 8)
- 5) Iron knob, 36 mm in diameter, with a central boss. At the rear of the knob is the stump of an iron rod. (Pl. 86A, 10)
- 6) Iron knob, 33 mm in diameter, with a stepped profile and a central button. (Pl. 86A, 9)
- 7) Fragment of an iron knob or phalera with stepped profile, originally ca. 68 mm in diameter. (Pl. 86A, 12)
- 8) Fragment of an iron knob or phalera with stepped profile and central button, diameter ca. 60 mm. At the rear of the knob is the stump of an iron rod. (Pl. 86A, 11)
- 9) Fragment of an iron phalera with stepped profile, originally ca. 107 mm in diameter. (Pl. 86A, 13)
- 10) Numerous small fragments of iron sheet.
- 11) Various small sherds.
- 12) Fragment of unburnt bone.

Museum: Städtisches Museum, Memmingen (inv. no. 3690).

131 Olching – Neu-Esting, 'Leberberg'

(Kreis Fürstentum, Reg.-Bez. Oberbayern)

References: Westenrieder 1807, 204–217; Hartmann 1877, 1–12; Reinecke 1905a, 38–43; Weber 1909, 28; Kossack 1959, 198; Schwarz 1977, 177–82. Unpublished manuscript by L. Westenrieder, dated 1789, in the Bayerische Staatsbibliothek, München ('Tagebücher'). Unpublished manuscript by L. Westenrieder in the Bayerisches Landesamt für Denkmalpflege, München.

Description: Westenrieder described his excavations at Esting in a report which was of a remarkably high standard for its time (Westenrieder 1807). The 'Leberberg' was the largest tumulus (diameter 111' or 32.4 m, height 7' or 2.04 m) in a cemetery of about 30 tumuli, situated between Esting and Geiselbullach. The excavators dug a N-S trench through the tumulus and near the centre hit upon various pieces of 'copper', rotten wood and human bones. Further examination uncovered a 'basin' (? chamber), 9 × 7' (or 2.63 × 2.04 m) in size. In the 'basin' were numerous closely-packed sherds of pottery vessels, seven iron tyre fragments, bent into oval shapes or straight, and some bones.

Of particular importance were three timbers decorated with small circular ornaments (Pl. 86B, 6) and nails (Pl. 86B, 10–11). The finds are drawn on a plan (Fig. 197); the three timbers are marked A.B and C.D. The two timbers 'A.B' were only decorated with these ornaments on their upper sides, on the lower sides they were bound transversely by (metallic?) bands. These timbers (A.B) were probably longer than shown on the plan, the area around 'O' and 'A' on the plan having been excavated first, without due care and attention. At 'O', 'B' and 'D' on the plan were found round phalerae (Kossack 1959, pl. 61, 5), provided with a nail in the middle. At 'D' there were two phalerae, at 'O' and 'B' only one each. By every phalera was a mass of small hollow round nails (Pl. 86B, 8–9). Each phalera was surrounded by four (concentric?) circles of such nails. The nails were fixed to leather, as slight leather remains showed.

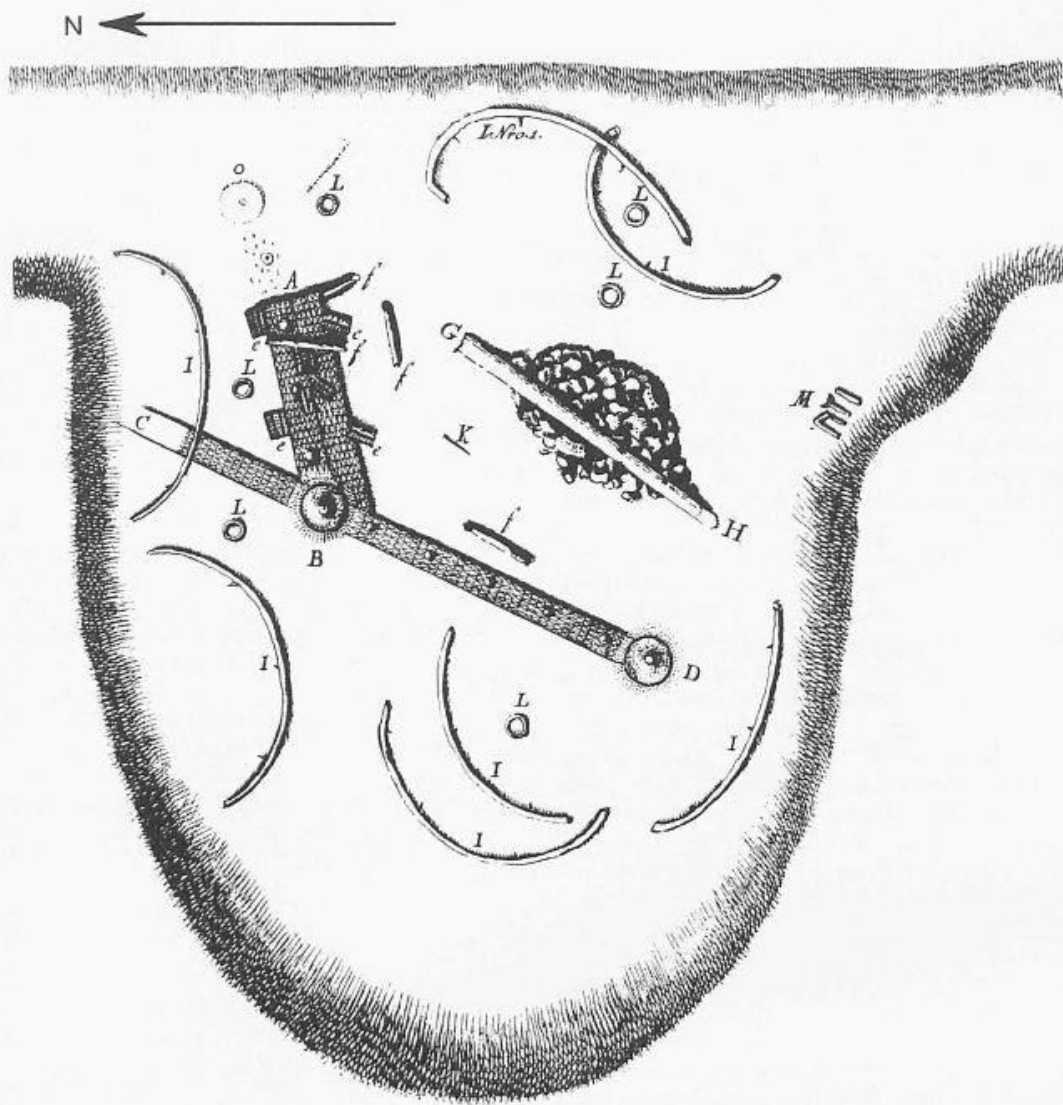


Fig. 197 Olching-Neu Esting, 'Leberberg': plan of the excavated area (after Westenrieder 1807). – Scale 1:20.

There were also 'various pieces of wood covered over and over again with nails' (location not mentioned by Westenrieder).

The northernmost of the two timbers (A.B) was $4\frac{1}{2}$ " wide (131 mm), the southernmost was 4" wide (117 mm). The N timber was decorated with four metal bosses. 14 openwork bronze plaques were found on or by the timbers (marked 'e' on Fig. 197): five larger ones (Pl. 86B, 1), five medium sized (Pl. 86B, 4) and two each of the two smaller types (Pl. 86B, 2.5). All of the openwork bronze plaques had iron 'catches' on one side, some fragments of leather reins show how they were attached. The third timber (Fig. 197, C.D) may have been longer than 6' (1.75 m). At 'C' the timber continued but was difficult to discern, because here it was not covered with decorative nails. This timber was decorated all over with nails, not only on the upper side like 'A.B', and it was semi-circular in cross-section.

Unburnt bones were found at 'f.f.f' and near 'K' (Fig. 197); sherds were found between 'G' and 'H'. At point 'K' was a bronze pin (Pl. 86B, 3).

The iron tyres 'I.I.I' on Fig. 197 were rounded on the outside but rather concave on the inside. Alongside the iron tyres lay six

metal rings, marked 'L' on the plan (Pl. 86B, 7). Remains of iron were found frequently in the grave, but it was so corroded that the excavators could not make out the original form (e.g. at 'M' on Fig. 197).

In the Bayerisches Landesamt für Denkmalpflege, München, are a series of drawings by (or after) Westenrieder. One grave plan is marked 'Ausgegr. l. u. 3. Juli 1789 v. Westenrieder'. This plan shows the first stages of excavation of the 'Leberberg' tumulus (see below). The plan shows numerous vessels and bones in the E side of the grave, some bones in the middle, and seven fragments of iron tyres in the W. One of the tyre fragments is drawn in detail again, and shows long nails, remains of two 'T'-shaped felloe-clamps, and a large rectangular fragment ('U'-shaped felloe-clamp?); a note reads 'war sichtbar Holz inzwischen die vier Nägel' (Fig. 198). This drawing indicates that the felloes were made with a composite Großseibstadt construction.

Westenrieder refers to this excavation in his diary: 'den ersten Juli bin ich mit Kenedy nach Buelach (ausser Dachau) gereist.



Fig. 198 Olching-Neu Esting, 'Leberberg': detail drawing of one of the tyres from the grave (after sketches by L. Westenrieder). – Scale 1:10.

um einige alte Grabhügel, welche daselbst häufig gesehen werden, im Name und auf Kösten der Akademie öffnen zu lassen. Der Gerichtschreiber von Dachau, Knorr war bei uns, da gegraben wurde. Wir fanden, da wir eben am Abend reisen sollte, einiges Eisen, und Menschengelbeine, alles in der eigentlichen Form bereits unkenntlich und vermodert'.

This must be the same expedition referred to by Westenrieder in his 'Geschichte der Kgl. bayerischen Akademie d. Wiss.' (1807, 205–207): '... Dieser Versuch wurde 1789 in Beyseyn zweyer akademischer Abgeordneter, Hrn. Ildephons Kennedy und Lor. Westenrieder, durch eine ebenfalls eigne Abordnung des Landgerichts Dachau in der Person des damaligen Hr. Gerichtschreibers und churfl. Sekretärs, des vortrefflichen Sebastian Knorr behandelt, und betraf die Untersuchung einiger, im besagten Gericht zwischen Esting und Geiselbuelach vorhandener uralter Hügel, ... man fieng bey der Ausgrabung mit dem grössten Hügel, welcher mit einem eignen, wie immer veranlassen Namen, der Leberberg, ausgezeichnet wurde, von Norden gegen Süden an ...'.

It seems certain that the plan of the tumulus of the 1st and 3rd of July 1789, mentioned above, refers to the first day of excavation of the Leberberg. But Westenrieder refers to the first finds from the Leberberg thus: '... verschiedene Stücke von Kupfer, dann verfaultes Holz und Menschenknochen...' – which would not correspond with the finds drawn on the unpublished plan (1807, 208). However, he then goes on to describe the next stage of results thus: '... eine Menge dicht beysammen liegender Scherben von irdenen Gefässen, dann sieben oval gebogene eiserne Reife, mehrere gerade Stücke Eisen, und einige Überbleibsel vermoderter Knochen...' (1807, 208). This agrees well with the situation on the unpublished plan. The published plan (Fig. 197) therefore corresponds to the final stage of excavation.

After the excavation of the Leberberg, Westenrieder opened two other tumuli, which contained no metallic remains. Grave plans of these tumuli also exist as drawings in the Bayerisches Landesamt für Denkmalpflege, München (tumuli II and III, excavated on the 4th July 1789). As the Leberberg was excavated immediately before tumuli II and III, it seems probable that the Leberberg is identical to the tumulus excavated on the 1st and 3rd of July 1789.

Comments: The finds from the 'Leberberg', with few exceptions (in museums in Wiesbaden and Hannover, see Reinecke 1905a, 38ff.), have been lost. Copies of some openwork bronze plaques are housed in the Römisch-Germanisches Zentralmuseum, Mainz.

132 Pilsach – Niederhofen, tumulus 4

(Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)

References: Torbrügge 1979, 271–272 (with further literature).

Description: Six tumuli are still visible in this cemetery. The excavations were carried out by G. Werner in 1900, and nine tumuli were opened. Torbrügge has little confidence in the reliability of the grave ensembles from this excavation.

Finds:

- 1) Numerous fragments of iron tyres, width ca. 20 mm, diameter ca. 1.04 m. The cross-sections are of type III. The tyre nails were hammered in every 100–130 mm, and the nail heads were countersunk (type G). The longest penetration shown by a nail is 78 mm. The tyre nails have traces of horizontal wood grain, except for two cases where the nails were obviously hammered into the spokes (Pl. 87A, 19–20). (Pl. 87A, 3–4.19–22)
- 2) Fragments of iron nave sheathings of type Breitenbronn. The nave-neck was sheathed with an iron band 57–60 mm in width (Pl. 87A, 5–7.9–10). The nave-head was sheathed with a conical ribbed iron sheet cap, made in one piece (Pl. 87A, 1–2).
- 3) Fragments of iron sheet, probably from felloe-clamps, width 48–50 mm. In two cases a join seems to be visible between two pieces of wood, the wood grains of which run in the same direction (Pl. 87A, 11.13). In one case, the end of the clamp is preserved, probably originally fixed by two iron nails (Pl. 87A, 8). (Pl. 87A, 8.11–16)
- 4) Fragments of two iron rings, square in cross-section, external diameter ca. 31 mm. (Pl. 87A, 17–18)
- 5) Iron sword. (Torbrügge 1979, pl. 44, 13)
- 6) Bronze belt-hook. (ibid. pl. 44, 14)
- 7) Numerous pottery vessels and sherds. (ibid. pl. 44, 15–18)

Museum: Germanisches Nationalmuseum, Nürnberg (inv. nos VB. 1924–1926).

133 Pöcking – Aschering, tumulus 8

(Kreis Starnberg, Reg.-Bez. Oberbayern)

References: Naue 1898a, 69–70; Weber 1899, 133; Naue 1903, 79; Reinecke 1905b, 353; Weber 1909, 52; Knöll 1944, 22.26; Kossack 1959, 220–221.

Description: This tumulus was excavated by J. Naue in 1897 or 1898. At a depth of 1.8 m, towards the E, lay two iron tyres, an iron ring, and fragmentary iron naves. The tyres were 1 m apart. At a depth of 2 m Naue found an inhumation burial with a bronze sword; alongside the sword, slightly to the W, he found a set of three bronze toilet implements. Three undecorated pottery vessels were located to the E, and two decorated vessels were discovered at the feet of the skeleton. By the latter two vessels were some very small bronze spirals, which fell to pieces on removal.

Comments: Reinecke (1905b, 353, note 4) doubted the association of the bronze sword with the rest of the finds. Indeed, the wagon parts were found 200 mm above the other finds, and somewhat to the E. Knöll (1944, 26, note 189) noted that the sherds from tumulus 8 were stored together with those from tumulus 4. However, he stated that it is, in the main, possible to distinguish between the vessels of the two grave ensembles. Kossack, in his list of the grave goods, also includes a bronze belt-hook and a bronze (?) pin shank; these were not mentioned by Naue, although the belt-hook ('... flügelartig gebogenes Bronzestück') was noted by Weber (1899, 133). To sum up, the wagon remains cannot be regarded as securely associated with the other grave goods.

Find:

- 1) Two iron tyres. Lost.
- 2) Iron ring. Lost.
- 3) Fragmentary iron naves. Lost.
- 4) Bronze *Vollgriffschwert*, organic pommel not preserved. (Kossack 1959, pl. 90, 6)
- 5) Set of three bronze toilet implements. (ibid. pl. 90, 8)
- 6) Bronze belt-hook. (ibid. pl. 90, 7)
- 7) Shank of a bronze pin (?). (ibid. pl. 90, 9)
- 8) 'Very small bronze spirals'. Lost.
- 9) Five pottery vessels. (ibid. pl. 90, 10–14)

Museum: Prähistorische Staatssammlung, München (inv. no. 1898, 36,1–5).

134 No grave allocated.**135 Pullach i. Isartal, 'Gruppe Süd', tumulus 3**

(Kreis München, Reg.-Bez. Oberbayern)

References: Naue 1884, 258–262, 270–271; Weber 1909, 160; Kossack 1959, 214–216; Ruckdeschel 1961, 20–47.

Description: The 'southern' cemetery contained 23 tumuli, of which 17 were excavated in 1882–83 by J. Naue. Tumulus 3 was the largest in the cemetery (diameter 15–20 m, height 2.1 m). Naue described the finds thus:

At a depth of 1.8 m, was a circular arrangement of ash, 300–350 mm wide, with a diameter of 2–2.5 m, leaving a circular empty space in the middle. The finds all lay on the ash layer, and each had a strip of birch bark under it and covering it. On the E part of the ash layer stood the pottery vessels, 12–15 in number. To the SW were two bronze horse bits, and close by were some bronze decorative objects from the harness, arranged in a cross-shape, each with remains of leather reins (Naue 1884, pl. 15, 8). More to the NW were some small pieces of wood decorated with small bronze nails (ibid. pl. 14, 7), a piece of wood with a larger round iron boss as well as a small bronze nail (ibid. pl. 14, 9), some headless iron nails, etc. (ibid. pl. 14, 10–12). Further to the S were the first parts of the wide leather straps, with a large bronze anchor-shaped plaque and a bronze 'Jochschnalle'. Beyond this was another cross-shaped arrangement of reins, this time with four large round bronze knobs (ibid. pl. 14, 8), beyond this were four more bronze 'Jochschnallen' arranged in a row, and a fifth slightly to one side, close by were some bronze rings. Then followed a wide section of leather which was decorated both on its upper and lower sides with bronze knobs. Four more 'Jochschnallen' were found further towards the S, and finally there was another anchor-shaped bronze plaque (ibid. pl. 14, 1–3). Then followed another wide section of leather, richly decorated with larger and smaller bronze knobs, and then a somewhat narrower short band of leather (but decorated with larger bronze knobs), on and by which lay some small bronze rings. Slightly to the S lay two fragments of wood, 105 and 120 mm long and 20 mm wide. Further to the SE there were no more finds. Towards the N, however, were found two bronze sockets, one of which still with a fragment of wood preserved (Pl. 87B). Close by was a quantity of rotten wood and a number of larger and smaller bronze nails, about 12 large round iron buttons (mentioned above 'just NW of the horse bits') (ibid. pl. 14, 9), and some small headless iron nails. Naue suggested that the finds in this area could be the remains of a wagon.

Comments: A similar circular arrangement of ash was found by

Naue's pupil, H. von Preen, in his excavation of Helpfau-Uttendorf tumulus 5 (cat. no. 176B). It is not certain whether these excavation results are absolutely reliable.

Find:

- 1) Two cast bronze sockets, with socket-openings at right-angles. The top of the socket is terminated by a round lens-shaped knob. In each case one of the side-arms is closed, bearing the remains of a bronze ring. (Pl. 87B)
- 2) 11 domed iron knobs. (Kossack 1959, pl. 80, 14, 19)
- 3) Six round domed bronze knobs, with a central nail which is bent to one side. (ibid. pl. 80, 15)
- 4) Four small bronze nails with round domed heads. (ibid. pl. 80, 9)
- 5) Two bronze horse bits. (ibid. pl. 80, 6–7)
- 6) Eight bronze hollow-cast cross-shaped rein-crossings. (ibid. pl. 80, 25–31; Naue 1884, pl. 15, 8)
- 7) Small looped bronze rein-knobs with a flange and small boss. (Naue 1884, pl. 14, 8)
- 8) 15 tubular rein ornaments, one side ribbed, the other side open. (Kossack 1959, pl. 80, 8; Naue 1884, pl. 15, 8)
- 9) Remains of a leather yoke decorated with bronze buttons. (Kossack 1959, pl. 80, 10–13, 20–22; Naue 1884, pl. 13)
- 10) Leather straps with 10 'Jochschnallen' (Kossack 1959, pl. 80, 4–5) terminated with two openwork-decorated 'Jochschnallen' with anchor-shaped ends. (ibid. pl. 80, 3; Naue 1884, pl. 14, 1–4)
- 11) Five bronze rings. (Kossack 1959, pl. 80, 16–18, 23–24)
- 12) 12–15 pottery vessels. (Ruckdeschel 1961, 41, fig. 13, 1–3; Naue 1884, pl. 17, 6 and possibly pl. 16, 7)

Museum: Prähistorische Staatssammlung, München (inv. nos A.582–634).

136 Riedenheim, 'Fuchsbühl'

(Kreis Würzburg, Reg.-Bez. Unterfranken)

References: Wamser 1978, 334–335; Wamser 1980a, 122–7; Wamser 1981a, 248–50.

Description: The 'Fuchsbühl' was a large isolated tumulus 56 m in diameter and 6 m in height (original dimensions ca. 46 m in diameter and ca. 10 m high). Most of the central grave was destroyed by illegal excavations in 1971, and the remains were excavated by the Bayerisches Landesamt für Denkmalpflege in 1978 and 1979. Two central burials were found, of which the primary grave contained a wagon. The grave had a chamber 5 × 4.4 m in size, protected by stone packing (Wamser 1980a, 123, fig. 28 and 124, fig. 29). There was an earthen, stone-paved ramp for the wagon in the W part of the stone packing. Excavation showed that the chamber had already been robbed in antiquity, but remains of the spokes of the wagon survived. These were of wild fruit wood, very probably plum, and were sheathed at the base with bronze sheet cuffs. Remains of three pottery vessels were also found.

Find:

- 1) Bronze sheet cuffs from the bases of wooden spokes. The cuffs were oval in cross-section, and measured ca. 42–46 × ca. 34–35 mm. (Pl. 88B)
- 2) A few bronze dome-headed nails. (Wamser 1980a, 127, fig. 31, 10–13)
- 3) Two small bent iron rods (remains of nails?). (ibid. fig. 31, 20–21)
- 4) Remains of three pottery vessels. One of the vessels has 'soot' decoration, related to the vessels from the Demmelsdorf wagon-grave, and to examples from the Heuneburg

(Voss 1984, 385). (Wamser 1980a, 127, fig. 31, 25; and 125, fig. 30)

Museum: Prähistorische Staatssammlung, München.

137 Schesslitz – Demmelsdorf

(Kreis Bamberg, Reg.-Bez. Oberfranken)

References: Abels 1983, 69–72; Abels 1985, 71–84; Abels 1986a, 17–18.

Description: A completely flattened tumulus was discovered during pipe-laying in 1983, and was immediately excavated by the Bayerisches Landesamt für Denkmalpflege, Bamberg. The tumulus belongs to a small group of tumuli, of which four are still visible today, with a height of 0.5–1 m. The excavators found a stone packing 3.8×2.8 m in size and orientated NNE–SSW. Under the stone packing was a wooden grave chamber with the same orientation, measuring 2.8×2 m (Fig. 199). The contents of the chamber had been disturbed by agricultural activity, particularly in the E half. The W part of the chamber contained a skeleton lying (head)SSW–NNE(feet). Anthropological study of the surviving bones indicates a female about 35 years old. The personal goods of the woman include a set of five bronze neck-rings, 10 bronze arm-rings, 12 hollow bronze earrings or hair-rings, a large amber bead, two rod-shaped bronze pendants, two drum fibulae (*Paukenfibeln*), an undecorated bronze belt-sheet, a small spiral of gold wire, and some iron and bronze fragments. A reconstruction of the woman's costume is provided by Abels (1985, 74, fig. 4)

In the SE corner of the chamber were some pig bones. Seven pottery vessels were found *in situ*, and sherds indicated the presence of at least five further vessels. The position of the vessels can be seen on the grave plan (Fig. 199).

The grave chamber also contained the remains of a wagon, the wheel remains of which occupied most of the interior of the chamber. Under the place where the two N tyres crossed were found two small fragments of wood which preserved negative impressions of decorated bronze sheet. Tiny fragments of bronze sheet and small bronze nails were found all over the area of the chamber; on some of the fragments embossed decoration can be seen, showing that the decoration of the bronze sheet was originally divided into horizontal zones and metopes containing circles, human and animal figures. Abels concludes that the two fragments of wood with negative impressions of bronze sheet, as well as the bronze nails used to fix the bronze sheet (with a length of up to 10 mm) show that the bronze sheet fragments were not the remains of a bronze belt-sheet; instead, the decorative bronze sheet was applied to wood (Abels 1985, 76), probably the sides of the wagon.

200 mm under the wagon-grave the excavators uncovered the primary grave chamber of the tumulus, containing a cremation burial, 16 pottery vessels, an iron knife, and a bronze chape (Ha C). Under the primary grave chamber the earth was burnt, showing that the chamber was built on the funeral pyre. The primary and secondary grave chambers had the same orientation (NNE–SSW), and it would seem that the secondary grave was intentionally placed above the primary grave; Abels wonders if the dead were related (1985, 82).

Finds:

- 1) Fragmentary remains of four iron tyres with type VII cross-section, 30 mm wide. The tyres had a diameter of about 800 mm, and were fastened to the felloes by iron nails positioned about 120 mm apart. The nails had large flat heads of irregular shape. (Pl. 88A, 1)

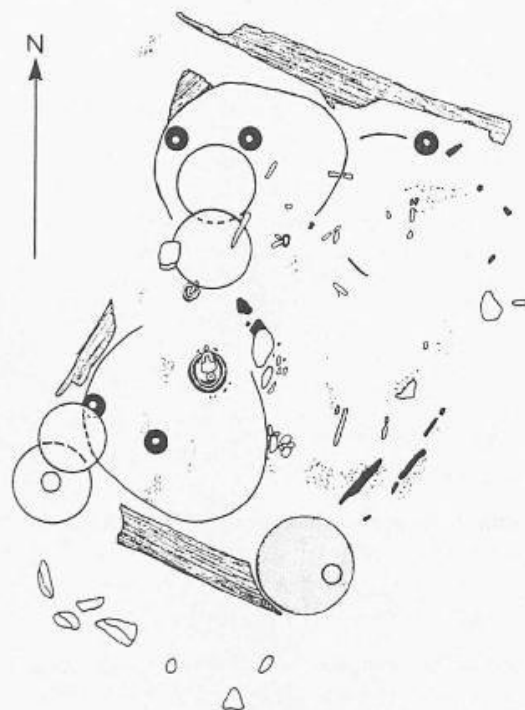


Fig. 199 Schesslitz-Demmelsdorf: plan of the wagon-grave (after Abels 1985). – Scale 1:40.

- 2) Six fragmentary iron nave-caps, 120 mm in diameter, with an axle-channel 50 mm in diameter. The nave-caps were each fixed to the nave by three iron nails. (Pl. 88A, 2–3)
- 3) At least 24 fragments of iron bands, 16–17 mm wide, with transverse wood grain on the internal side. (Pl. 88A, 4–5)
- 4) Numerous small fragments of bronze sheet, some with embossed decoration. One decorated fragment is pierced by a bronze nail 10 mm in length. Two fragments of wood carry negative impressions of embossed bronze sheet. A reconstruction of the decoration of the bronze sheet demonstrates a height of at least 110 mm (six horizontal decorated zones with an undecorated lower zone). The embossed decoration comprises circles, long-necked horses, human figures with raised arms, and four-legged animals (?dogs). The bronze sheet probably decorated the sides of the wagon. (Pl. 88A, 6–8)
- 5) Various fragments of bent bronze sheet, sometimes with bronze nails. (Pl. 88A, 13–16)
- 6) Numerous small bronze nails. (Pl. 88A, 9–11)
- 7) Five solid bronze neck-rings with engraved decoration. (Abels 1985, 74, fig. 3, 1)
- 8) 10 solid bronze arm-rings with ribbed decoration (*Steigbügelarmringe*). (ibid. fig. 3, 11)
- 9) 12 hollow bronze ear-rings or hair-rings. (ibid. fig. 3, 9)
- 10) Large amber bead. (ibid. fig. 3, 10)
- 11) Two bronze rod-shaped pendants. (ibid. fig. 3, 7–8)
- 12) Two bronze drum fibulae (*Paukenfibeln*) with coral inlay on the foot and bow. (ibid. fig. 3, 12–13)
- 13) Undecorated bronze belt-sheet with three or four rows of bosses at each end. (ibid. fig. 3, 14. Abels assigns the belt-sheet to Kilian-Dirlmeier's Amancey type, variant 3)
- 14) Small gold wire spiral. (ibid. fig. 3, 2)
- 15) A few bronze and iron fragments of amulets or jewellery. (ibid. fig. 3, 3–6)

- 16) At least 12 pottery vessels. (ibid. 75, fig. 6; 77, figs 7–8; see also Voss 1984)

Present location: Bayerisches Landesamt für Denkmalpflege, Bamberg.

138 Schmidmühlen – Markhof, tumulus of 1887

(Kreis Amberg-Sulzbach, Reg.-Bez. Oberpfalz)

References: Dahlem 1887, VII; Renz 1893, 211; Kossack 1954a, 152; Stroh 1975, 106; Torbrügge 1979, 261–262.

Description: The exact location of this tumulus is unknown and no report exists on the excavation. The finds were bought by the Regensburg museum in 1887. In 1893 further finds were acquired, apparently from this grave, including a bronze fibula, a bronze ring and an iron nail. The fibula is of La Tène date, and cannot belong to the grave.

Comments: Torbrügge notes mixing with Lengenfeld – namely the iron tyres and the nave fittings. Two (or possibly six) iron tyre fragments from the Markhof tumulus were indeed found among the Lengenfeld finds in the Regensburg museum, but there is no reason to think that any of the bronze nave-caps in the Lengenfeld complex came from the Markhof grave.

Finds:

- 1) 10 fragments of iron tyres, width 10–21 mm. The tyres are provided with a groove on the outer side to accommodate the long heads of the nails, which were hammered in every 40–70 mm. The longest nail penetration measured is 61 mm. The tyre nails carry wood grain, which in every case is horizontal. (Pl. 89A, 1–3.5)
- 2) Iron trident-shaped linchpin. The horizontal cross-bar of the linchpin originally carried iron rings or pendants. (Pl. 89A, 4)
- 3) Iron horse bit. (Torbrügge 1979, pl. 29, 1)
- 4) Two iron rings. (ibid. pl. 29, 2–3)
- 5) Two flat iron buttons with knobs in the middle. (ibid. pl. 30, 22–23)
- 6) Two bronze toggles. (ibid. pl. 30, 1–2)
- 7) Bronze ring with square cross-section, fitted with four small rings. (ibid. pl. 30, 21)
- 8) 39 bronze rings of various sizes. (ibid. pl. 30, 3–20)
- 9) 28 small bronze rein-knobs with a loop on the rear side. (ibid. pl. 30, 24–27)
- 10) Two glass beads. Lost.

Museum: Städtisches Museum, Regensburg (inv. no. A. 1235, 1253).

139 Starnberg – Mühlthal, tumulus 1 of 1885

(Kreis Starnberg, Reg.-Bez. Oberbayern)

References: Anon. 1885a; Hasselmann 1886, 2; Weber 1892, 187; Weber 1909, 51; Kossack 1959, 222; Schiek 1981, 289, note 25. Unpublished manuscript by F. Hasselmann, dated 1885, in the Prähistorische Staatssammlung, München ('Ausgrabungs-skizzen').

Description: This cemetery contained 29 tumuli, of which four were excavated by F. Hasselmann in 1885, and 25 by Naue in 1891. Hasselmann's tumulus 1 measured 22 m in diameter and 2.5 m in height; according to his plan of the cemetery, tumulus 1 was one of the larger tumuli, but definitely not the largest. The excavator cut through the tumulus with a trench, which was widened in the middle of the tumulus to a circular area. At a

depth of 2 m, iron fragments and 'fragments of unfired vessels' were found. It was impossible for the excavators to decide whether the iron fragments formed parts of vessels or parts of wheels (Anon. 1885a). The iron fragments were found in a layer of charcoal and pottery sherds.

It is not known whether Naue re-excavated this tumulus – Hasselmann drew a plan of the cemetery with his numbering of the tumuli but Naue did not, and a correlation of the two excavations is therefore impossible.

Finds:

- 1) 11 fragments of ribbed iron nave sheathings of Cannstatt type. The diameter of the nave-head was ca. 120 mm, of the nave-neck ca. 90 mm, and of the nave-stock ca. 146 mm. The diameter of the axle-channel was ca. 40 mm. The length of each nave-arm was at least 135 mm (only neck and head) the width of the nave-stock is not known. The nave sheathing was made from four different types of fitting, for the head, the neck, the breasting of the nave-stock, and the nave-stock itself. (Pl. 89B, 1)
- 2) 12 hemispherical iron knobs, fastened by iron nails to a wooden surface. (Pl. 89B, 2–4.6)
- 3) One fragmentary iron disc, diameter ca. 38 mm, in the centre of one side is the stump of a round iron knob. (Pl. 89B, 5)
- 4) Charcoal. Lost.
- 5) Sherds. Lost.

Museum: Prähistorische Staatssammlung, München (inv. no. 1891, 9–11)

140 Tutzing – Traubing, 'Kirchlehel', tumulus 2

(Kreis Starnberg, Reg.-Bez. Oberbayern)

References: Weber 1899, 133; Weber 1909, 54; Kossack 1959, 226.

Description: Tumulus 2 was excavated by J. Naue in 1897. The tumulus was said to contain fragments of iron naves.

Comments: The iron naves are noted in the inventory of the Prähistorische Staatssammlung, München (inv. no. 1898, 32), but have been lost.

141A Uffing a. Staffelsee, 'Willing', tumulus 1

(Kreis Garmisch-Partenkirchen, Reg.-Bez. Oberbayern)

References: Weber 1886, 2–7; Naue 1887a, 56–57.216–7.225; Naue 1887b, 184–186; Weber 1909, 46; Paret 1935a, 26; Kossack 1959, 241–242.

Description: With a height of 2.65 m and 87 paces in circumference, this was one of a pair of large tumuli rather isolated to the N of the rest of the cemetery. The cemetery contained 24 tumuli, of which 16 were excavated by J. Naue in 1885. At a depth of 2.8 m, Naue claims to have found a large iron sheet, 5 mm thick, measuring 5 × 4 m, and covered by a layer of rust 30 mm thick. On the 'iron layer' was a (?)two-wheeled vehicle facing to the SE. A little above the 'iron layer' were various iron and bronze fragments of horse harness (including a wheel-shaped bronze disc, three bronze ribbed knobs with remains of leather reins, several bronze rein ornaments, several bronze hemispherical knobs with holes, a few small bronze nails, a few small fragmentary bronze rings and fragments of the iron horse bit etc.) (Naue 1887a, pl. 37, 2–8). The wagon components comprised rotten wood, iron nails, two iron nave-sheathings complete with fragments of the wooden

nave, on which iron nails inlaid with bronze were found in a zig-zag arrangement (Naue 1887a, pls 37, 1; 38, 4). To the NE were pottery vessels (two bowls and one very small vase-shaped vessel, Naue 1887a, pl. 54, 9). Towards the W, under the 'iron layer', were several undecorated red sherds. No traces of a burial were found in this tumulus.

Comments: Naue seems to have found two nave-halves, which shows that his claim to have found a two-wheeled vehicle is unjustified, because he only found enough components for one wheel.

Finds:

- 1) One reconstructed nave-half with iron fittings. The nave-head is made from three iron components: a nave-cap 100 mm in diameter (with an axle-channel 52 mm in diameter), nave-head rings 140 mm in diameter, and a connecting ring between the nave-head ring and the nave-cap which is 98–100 mm in diameter. The nave-neck bears no metal sheathing, but was found by the excavators with large-headed iron nails arranged in a zig-zag pattern (Naue 1887a, pl. 37, 1). The nails, of which nine survive, carry cross-shaped inlaid bronze decoration (Pl. 90A, 2). The decoration is now very unclear, but it may have been better preserved when Naue made his drawings (1887a, pl. 37, 1 and especially pl. 37, 1b). The base of the neck is provided with an iron nave-stock ring, 'C'-shaped in cross-section and 200 mm in diameter, which bears complicated inlaid bronze decoration. The nave-stock ring is divided into three decorative zones by four lines of inlaid bronze. In the two outer zones are semicircles with central dots. In the middle zone is simple ladder-like decoration (Pl. 90A, 1). The length of the nave-half, from nave-stock ring to axle-cap is 173 mm, according to Naue's reconstruction. (Pl. 90A)
- 2) Various iron nails and fragments of iron tyres. Lost.
- 3) Wheel-shaped bronze disc with 10 thick 'spokes', measuring 48 mm in diameter. The disc is provided with a central hole through which projects a bent iron rod. The rod has a bronze sheet cap. Also remains of another iron rod, possibly from another of these. (Naue 1887a, pl. 37, 2; Kossack 1959, pl. 108, 24)
- 4) Three hemispherical bronze knobs with a short rivet. On the top of the knob is a biconical tube with three ribs, in which traces of leather reins were preserved. (Naue 1887a, pl. 37, 3; Kossack 1959, pl. 108, 27)
- 5) Fragments of decorative rein ornaments each with nine circular discs with circular decoration, and provided on the rear side with three loops. (Naue 1887a, pl. 37, 4; Kossack 1959, pl. 108, 28–32)
- 6) Three hemispherical bronze knobs, two of which with five holes. (Naue 1887a, pl. 37, 5–6)
- 7) Several small iron nails with biconical bronze heads. (Naue 1887a, pl. 37, 7; Kossack 1959, pl. 108, 26)
- 8) Several iron rings, some rusted together. (Kossack 1959, pl. 108, 22–23)
- 9) Three pottery bowls, one of which illustrated by Naue, with a slightly everted rim and omphalos base. (1887a, pl. 54, 9)

Museum: Prähistorische Staatssammlung, München (inv. nos A. 1201–1202).

141B Uffing a. Staffelsee, 'Willing', tumulus 6

(Kreis Garmisch-Partenkirchen, Reg.-Bez. Oberbayern)

References: Weber 1886, 2–7; Naue 1887a, 58–59, 216–218; Naue 1887b, 187–189; Weber 1909, 46; Paret 1935a, 26; Kossack 1959, 241–242.

Description: Tumulus 6 measured 99 paces in circumference and 2.85 m in height. This was one of the largest in a cemetery of about 24 tumuli; 16 tumuli were excavated by J. Naue in 1885. Naue notes that the tumulus had already been partly destroyed when part of the stone core of the tumulus had been removed to make a well. Even so, Naue estimated that the stone core still made up ca. 100 wagon loads of stones. The grave goods were found in and under the stone core. In the middle of the tumulus, already at a depth of 1.6 m, the excavators found fragments of iron tyres and, 650 mm deeper, remains of a bronze nave; close by were a few fragments of a bronze vessel with engraved triangular decoration on the rim. At a depth of 2.38 m, towards the W, lay parts of iron horse bits, a broken iron ring, two large bronze rings (a fragment of leather was preserved in the hole of one of the rings), and not far away was a bronze socket terminated by a decorated bronze disc. Not far from this, to the NW, were numerous fragments of iron tyres and tyre nails, spread over an area of 1.8 × 2 m. Among the iron tyres were remains of bronze naves (four according to Naue, i.e. four nave-halves; for a sketch of the grave see Naue 1887a, pl. 6, 8; *ibid.* 1887b, pl. 10, 8). Naue thought that the wheels were made of oak, and he also noted that the spokes were not clad with bronze sheet. He reconstructed two iron tyres and estimated an internal diameter of 780 mm. E of the wagon finds Naue claims to have found an 'iron layer' measuring 2 × 1.25 m, on which were a few animal bones. Under the 'iron layer' was a boar's skeleton and a few more bones. There were no traces of pottery vessels, charcoal or of a human burial.

Comments: Naue thought that the naves were conical in shape, rather than biconical. Thus, having found five nave-halves, he suggested that the four-wheeled wagon had been provided with a spare wheel. In fact, he only found five of the original eight nave halves. The grave had obviously been badly disturbed; perhaps some of the 'animal bones' E of the wagon actually belonged to an inhumation burial.

Finds:

- 1) Four reconstructed bronze and iron naves. The sheathings are ca. 165 mm long and are composed of: a thin iron nave-stock ring, a conical nave-neck of bronze sheet, a bronze nave-head ring and an iron nave-cap. The nave-cap has an axle-channel 46 mm in diameter. The nave-head ring measures 142 mm in diameter and has a profiled cross-section. The nave-neck is sheathed with a single sheet of bronze, which has a seam joined by small bronze nails with domed heads. The nave-stock ring has inlaid bronze decoration with cross and triglyph motifs, or simple lines punctuated at intervals by crosses. (Pls 90C, 3; 91)
- 2) 36 small fragments of iron tyres of type VC, width 22–23 mm, with closely spaced nails with large rectangular heads (ca. 16 × 30 mm). The nail shafts bear horizontal wood grain and the longest penetration preserved is 56 mm. (Pl. 90C, 2.4–8)
- 3) Bronze socket, length 27 mm, terminated by a decorated bronze disc, 40 mm in diameter. The socket is set off-centre at the back of the disc, and is provided with an iron rivet. Fragments of wood are still preserved in the socket. (Pl. 90C, 1)
- 4) Two bronze rings with profiled rim and central hole. (Kossack 1959, pl. 108, 14–15)
- 5) Several iron rings, possibly remains of horse bits. (*ibid.* pl. 108, 19–21)
- 6) Several iron rings rusted together, and fixed by further iron rings to a fragment of wood. (Naue 1887a, pl. 37, 14)

- 7) Fragment from the rim of a bronze vessel. (Kossack 1959, pl. 108, 18)
- 8) Bones of a boar, and other animal bones. Lost.

Museum: Prähistorische Staatssammlung, München (inv. nos A. 1205–1209a).

141C Uffing a. Staffelsee, 'Willing', tumulus 11

(Kreis Garmisch-Partenkirchen, Reg.-Bez. Oberbayern)

References: Weber 1886, 2–7; Naue 1887a, 60.212.217; Naue 1887b, 189–191; Weber 1909, 46; Paret 1935a, 26; Kossack 1959, 241–242.

Description: Tumulus 11 was one of the largest tumuli in a cemetery of 24 tumuli, with a diameter of 70 paces and a height of 1.1 m; 16 tumuli were excavated by J. Naue in 1885. The tumulus had been badly damaged in 1855–60 by the construction of a hut. The tumulus was largely made up of a stone core which extended to a depth of 1.2 m. Under the stone core, to the SW, were found bronze sheet fittings from a wagon and numerous small flat rings, each with a pair of nails. In some cases these rings were still found stuck into pieces of wood, and in a few cases a small bronze nail was found in the centre of the ring. Naue also found several larger and smaller bronze rein-knobs with a loop at the back. Fragments of iron tyres and nails were also found near the bronze fittings. 60 mm to the NE of these finds was a fragmentary barrel-shaped lignite arm-band. To the N were a few narrow nail-like iron fragments and two bent iron fragments, on which fragments of wood were still preserved. A boar's skeleton was found not far from the iron tyres.

Finds:

- 1) Two fragments of a curved bronze ribbed band. The band was fixed by closely spaced spherical-headed bronze nails. In one case, a fragment of wood is also preserved. (Pl. 90B, 1–3)
- 2) Fragment of curved bronze sheet. Lost. (Naue 1887a, pl. 38, 6)
- 3) Fragment of ribbed bronze sheet, possibly from the navel-neck sheathing. Lost. (ibid. pl. 38, 7)
- 4) Fragments of wooden spokes clad with bronze sheet, mostly lost. (Pl. 90B, 4; and Naue 1887a, pl. 38, 8)
- 5) Various bronze nails. Lost. (ibid. pl. 38, 9–15)
- 6) Larger bronze rein-knobs with loops on their rear sides, diameter ca. 11 mm. Lost. (ibid. pl. 38, 16)
- 7) Smaller bronze knobs with a small eye on the rear side, diameter ca. 6 mm. Lost. (ibid. pl. 38, 17)
- 8) Numerous flat bronze rings, each with two nails on the rear side. In the middle of the rings was a small bronze nail. These rings were nailed to wood. Lost. (ibid. pl. 38, 18)
- 9) Iron tyres. Lost. (ibid. pl. 38, 20)
- 10) Small iron fragments (? nails). Lost.
- 11) Fragments of a barrel-shaped lignite arm-band. Lost. (ibid. pl. 28, 2)
- 12) Boar's skeleton. Lost.

Museum: Prähistorische Staatssammlung, München (inv. no. A.1211).

142 Ursensollen – Erlheim, find of 1912

(Kreis Amberg-Weizbach, Reg.-Bez. Oberpfalz)

References: Stroh 1975, 130; Torbrügge 1979, 389–390.

Description: These finds were discovered during the building of a railway crossing in 1912. A note makes mention of a 'zweirädrigen

Wagen mit schmalen Radspurkränzen, von Brandspuren, bandiger Tonurne und Tierknochen'. All these finds are lost, but a few bronzes survive (three arm-rings, two pins, one pin from a fibula: Torbrügge 1979, pl. 170, 3–6). It is not known if they came from the wagon-grave.

Museum: Städtisches Museum, Regensburg (inv. no. 1952/166).

143 Velburg – Lengenfeld, tumulus of 1870

(Kreis Neumarkt i. d. Oberpfalz, Reg.-Bez. Oberpfalz)

References: Niederle 1891, 30; Steinmetz 1902, 233–246; Kossack 1954a, 151–2; Stroh 1975, 182; Torbrügge 1979, 306–309. Unpublished manuscript by F. Birkner, dated ca. 1908, in the Prähistorische Staatssammlung, Munich ('Bayerische Funde im Museum für Völkerkunde, vorgeschichtliche Abteilung, Berlin').

Description: This grave was opened in 1870, but the finds first reached the museum in Regensburg in 1879. In 1875 the finds were sent to the Anthropological Exhibition in Munich, and at that time an inventory of the finds was made. Certain of the finds were sold to the museum in Munich on this occasion (one bronze nave-cap, eight bronze hemispherical knobs with nails around the base; inv. no. A. 504–511.516).

The grave was found in a levelled tumulus. Deep ploughing was repeatedly hindered by the stone packing of the grave, and a farm worker was sent to remove the stones in November 1870. The worker uncovered a rectangular stone packing 18 × 8' in size (2.34 × 5.25 m). Under the stones came reddish earth, and then the grave goods: 'positioned more in the middle of the area than at the edge; under the inhumation was ordinary soil. The pottery sherds were found in four different positions, and indeed 8' (2.34 m) apart from each other, but particularly to the E. Not much remained of the skeleton; among the bones was much bronze and iron, bronze positioned more to the middle, iron more outwards; two large rings were found 2' (0.584 m) apart, around which were numerous small rings with knobs, and inside was much grey and brown wood. The area in which the rings and the knobs were found had a length of 8' (2.34 m) and almost the same width' (Report of the farm worker, quoted by Steinmetz 1902, 234–235). One of the bones was examined in Munich and found to be from a young pig. The location of the discovery was inspected by Dahlem in 1878, and he found 'bronze remains, sherds and an iron horse bit'.

It is instructive to compare the full inventories of 1875 (by Eckart, at the time of the Anthropological Exhibition) and 1902 (Steinmetz 1902, 236). An iron knife mentioned in 1875 was not present in 1902, and six bronze rings with nails had also been lost (out of a total of 86). Otherwise, the find had suffered no depletion (except for nine objects sold to the museum in Munich, see above). Comparing the situation in 1902 with that of today, it is found that only one bronze ring with nails has been lost since then. It can therefore be concluded that since its rather chaotic discovery, this find-complex has remained intact.

The tyres are the only exception, because they were mixed with other tyres in the museum; luckily they were carefully described by Steinmetz: '... sie sind auf der unteren Seite, wo sie, 2 cm breit, auf dem Radkranz auflagen, flach, oben dagegen bis zu 1 cm gewölbt. Die befestigenden Nägel, deren Köpfe nicht über die Reifenoberfläche hervorstehen, sind in nicht ganz regelmäßigen Abständen von etwa 10 cm eingelassen. Ihr Querschnitt zeigt ein schmales Oblongum von 10 × 3 mm; die Länge beträgt bei einigen noch 50 mm, wozu dann noch die abgebrochene Spitze zu rechnen wäre' (Steinmetz 1902, 242–3). Six tyre fragments do not correspond to this description, two

obviously from Schmidmühlen-Markhof, and four possibly from there.

The farm worker is supposed to have sold other finds from this grave, and the assemblage which today survives is therefore by no means complete. Some of those finds may have enriched the ensemble from Beratzhausen grave 3.

Finds:

- 1) Fragmentary iron tyres, one fully reconstructed to give an internal diameter of ca. 720 mm, and 10 more fragments. Width ca. 21 mm, cross-section 'D'-shaped. The nails are hammered in every 80–100 mm, and their heads are countersunk. The maximum penetration is 47 mm. One nail bears diagonal wood grain. (Pl. 94A)
- 2) Three complete bronze nave-caps, and six fragments which make up at least two more full nave-caps. The nave-caps have an external diameter of 134–143 mm and an internal diameter of 60–62 mm. They were affixed by as many as 14 bronze nails. (Pls 92; 93, 1–2; Torbrügge 1979, pl. 73, 3)
- 3) Linchpin made from an iron rod of circular cross-section (diameter 8–10 mm). At the base of the triangular decorative part, where it joins the shank, there is a cast bronze sleeve – probably a repair (see also Drescher 1958, pl. 18). In the loops of the linchpin hang triangular iron pendants. A small fragment of bent iron rod could be the remains of a second linchpin. (Pl. 93, 6–7)
- 4) 86 large and small bronze rings with triangular cross-section, each provided with three or four nails. (Torbrügge 1979, pls 74, 1–8; 75, 13–20)
- 5) 48 hemispherical bronze knobs, each with four nails. (ibid. pl. 74, 21–24)
- 6) 18 wheel-shaped bronze decorative fittings, of various sizes, each provided with a hole in the middle for a small bronze nail. (ibid. pls 72, 8–12; 74, 11–13, 15–20)
- 7) Seven openwork bronze plaques with remains of iron rings in the holes of their upper sides. (ibid. pl. 72, 1–7)
- 8) 10 fragments of bronze sheet bands, 10–11 mm in width, some of which have small nail-holes. (Pl. 93, 3–5, 8)
- 9) One fragment of a bronze sheet yoke-band, width 34.3 mm, with a circular embossed motif and raised edges. (Pl. 93, 9)
- 10) Iron sword. (Torbrügge 1979, pl. 76, 3)
- 11) Bronze chape of type 'Freihausen'. (ibid. pl. 76, 2)
- 12) Iron horse bit. (ibid. pl. 77, 2)
- 13) Two bronze toggles. (ibid. pl. 72, 14–15)
- 14) Plaster-cast of two bronze pendants, nailed together. (ibid. pl. 75, 7)
- 15) Four bronze rings. (ibid. pls 74, 9–10, 14; 75, 9)
- 16) Two small bronze nails, square in cross-section. (ibid. pl. 75, 11–12)
- 17) Fragment of iron wire, or a pin. (ibid. pl. 72, 13)
- 18) Remains of a bronze broad-rimmed bowl (*Breitrandschale*). (ibid. pl. 78, 2)
- 19) Two large hollow-cast bronze rings, decorated with dot-and-circle motifs. (ibid. pls 74, 25; 75, 5)
- 20) Iron knife. Lost.
- 21) Pottery sherds. (Steinmetz 1902, pl. 9)

Museum: Städtisches Museum, Regensburg (inv. no. A.1253); Prähistorische Staatssammlung, München (inv. nos A.501–511.516).

144 Waltenhausen, 'Hairenbuch', tumulus III (Kreis Günzburg, Reg.-Bez. Schwaben)

References: Christ 1865, 5043–5044, 5059–5060; Anon. 1867, 36; Braun 1937, 19–20; Hübener 1957, 145, fig. 19, 6 and p. 157;

Kossack 1959, 161–162. Unpublished manuscripts in the Heimatmuseum, Krumbach, in the Prähistorische Staatssammlung, München, and in the Bayerisches Landesamt für Denkmalpflege, Augsburg.

Description: The largest tumulus in a cemetery of six tumuli was excavated by F. Baader in 1866 (height 10' or 2.92 m, diameter 44' or 12.84 m). The finds were at the base of the tumulus, in the centre, and were arranged in a circle of 2.9 m diameter around a bronze cauldron. The bronze cauldron contained 'ash', a fragmentary bronze sheet ring, a bronze socket and several fragments of a decorated bronze belt-sheet. The excavator mentioned some remains of leather belts, near which were two bronze ringed rods, 12 bronze rein-knobs, an amber bead and a bronze arm-ring. Not far from the leather belts was a gold finger-ring. Also found were 60–63 iron nails (fragments of iron tyres), and two pottery vessels filled with 'ash'.

Comments: Baader made numerous sketches of the objects from this tumulus, which enable the finds to be identified in the museums of Krumbach, Memmingen, and Nürnberg. The 'fragmentary bronze sheet ring' could not be found in any of the museums, but Baader's sketch seems to depict a fragmentary bronze nave-head ring of Erkenbrechtsweiler type.

Finds:

- 1) Seven tyre nails with fragments of iron tyres (type VC). The width of the tyres measures ca. 24 mm. The nail heads are long, ca. 50 × 20 mm. The nails bear horizontal wood grain, and the longest penetration preserved is 59 mm. (Pl. 94B, 1–3)
- 2) Fragmentary bronze nave-head ring. Lost. (Pl. 94B, 4)
- 3) Bronze rod, circular in cross-section, with a loop at each end. In one loop is a bronze ring with square cross-section. (Pl. 94B, 9)
- 4) Small bronze ring with triangular cross-section, and another similar ring with a rod-shaped projection. (Pl. 94B, 6–7)
- 5) Bronze ring-footed rein-knob, 35 mm in diameter, with a central nipple and broad flange. Two fragmentary leather reins are preserved. (Pl. 94B, 8)
- 6) Bronze rein-knob with a single loop on the rear side, diameter 28 mm, with a central nipple and broad flange. A fragmentary leather rein is preserved in the loop. (Pl. 94B, 13)
- 7) Bronze rein-knob, with two loops on the rear side, diameter 30 mm, with a central nipple and broad flange. A fragmentary leather rein is preserved in the loops. (Pl. 94B, 12)
- 8) Bronze arm-ring, 94.5 mm in diameter, 5 mm thick. The outside of the ring has ribbed decoration. (Pl. 94B, 11)
- 9) Fragmentary iron disc-headed socket, length 25 mm. (Pl. 94B, 5)
- 10) Nine fragments of decorated bronze belt-sheet. The belt-sheet carries engraved 'rocker' decoration ('*Tremolierstich*'). (Pl. 95A, 1.3–5)
- 11) Fragments of a bronze cauldron with a thickened rim, and originally four iron ring attachments. (Pl. 95A, 2.6)
- 12) Leather belts or reins. Lost.
- 13) Two pottery vessels filled with ash (and/or cremated bone?). Lost.
- 14) Amber bead. A sketch by Baader shows a small bead, probably less than 10 mm in diameter. Lost.
- 15) Gold finger-ring with three ribs. (Pl. 94B, 10)

Museum: Germanisches Nationalmuseum, Nürnberg (inv. nos VaK 642.644–647.740); Heimatmuseum, Krumbach (inv. nos

1015–1016.1019.1024–1026.1028.1029); Städtisches Museum, Memmingen.

145 Wehringen, 'Hexenbergle', tumulus 8

(Kreis Augsburg, Reg.-Bez. Schwaben)

References: Krahe 1963, 100–101; Schwarz 1963, 180–182; Schwarz 1969, 75, fig. 3; Uenze 1971, 177f.; Schneider et al. 1977, 23, fig. A.2; Christlein and Braasch 1982, 89–92. Unpublished excavation report by W. Titze, dated 1961, in the Bayerisches Landesamt für Denkmalpflege, Augsburg ('Bericht über Rettungsgrabungen...').

Description: Tumulus 8 was the largest in a group of nine tumuli,

which are called the 'Hexenbergle' (diameter 46 m, height 1.1 m). The excavations were carried out by the Bayerisches Landesamt für Denkmalpflege, Augsburg, in 1961. The first discovery of the excavations was the roof of a central grave chamber, which was preserved in the form of a ridged gray loamy layer. The edges of the wooden chamber were plainly visible, and the beams from the sides were sunk into the natural ground surface (dimensions 5.2 × 4.5 m; orientation of the chamber NE-SW). The remains of the wooden roof of the chamber were removed, and the lay out of the grave goods could be discerned (Fig. 200): the wagon in the NE corner, three large pottery plates by the NW side and 18 vessels in the SE corner along with a bronze sword, a winged chape and a small gold cup (Figs 97–9). Two piles of cremation lay on the wagon, a third lay

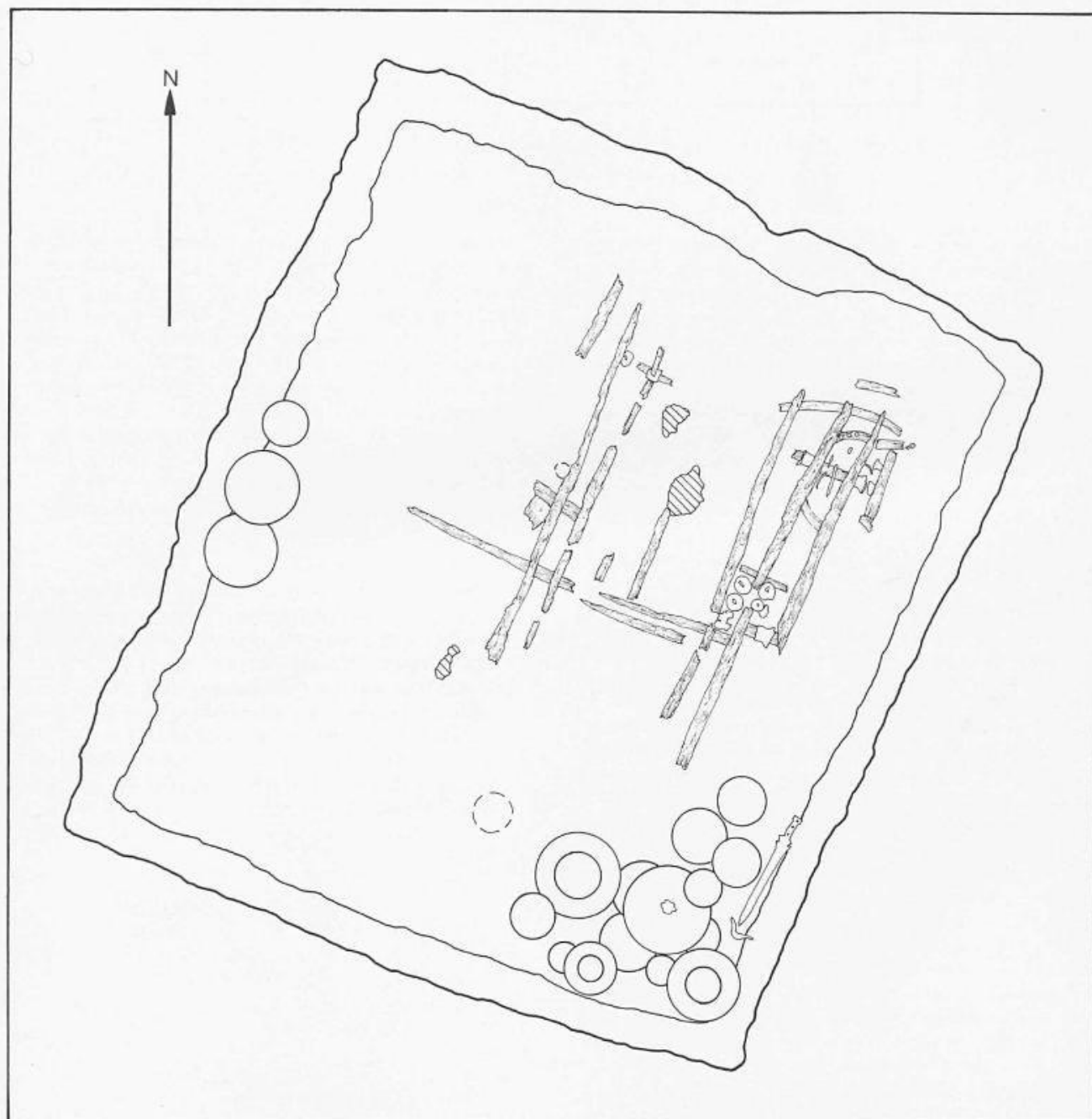


Fig. 200 Wehringen, 'Hexenbergle', tumulus 8: plan of the grave chamber (cremated bone is hatched, post-holes are indicated by a broken line). – Scale 1:40.

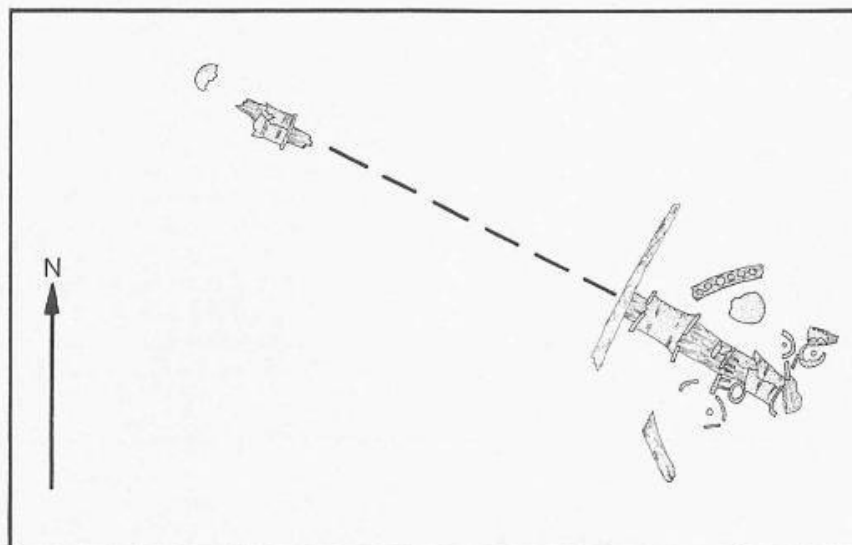


Fig. 201 Wehringen, 'Hexenberg', tumulus 8: detail of the rear axle of the wagon (bronze objects are stippled). – Scale 1:20.

somewhat SW of the front right wheel of the wagon. Near the centre of the chamber was a wooden post (length 750–800 mm, diameter 160 mm), to support the roof. A second post-hole, near the SW side, probably belonged to neolithic settlement remains.

Wooden remains of the two wagon axles were preserved, and the wheel base measured ca. 1.1 m. The nave of the front right wheel was not preserved, and the outer nave-half of the front left wheel was incomplete; the outer nave-half of the back right wheel had also not survived. Otherwise, the bronze nave fittings were still in place, and it was possible to measure the wheel gauge (ca. 1.4 m). The felloe of the back left wheel appears to have been preserved in part – it carried bronze decorative knobs, and had a diameter of ca. 750 mm (Fig. 201).

In the most complicated parts of the grave floor (around the NE and SE wheels) the finds were removed *en bloc*, encased in soil, and excavated under laboratory conditions. Detailed sketches were drawn, providing information concerning the construction of the wagon. The outer nave of the front left wheel was excavated in three layers. After the upper half of the bronze nave sheathing was removed, a wooden fragment was revealed. Between the wooden fragment and the nave, on the outer side of the wheel, were numerous small bronze wedge-shaped objects.

When the lower half of the bronze nave was removed a long fragment of wood was revealed, running roughly NE-SW (Pl. 97A, 8). The fragment was decorated on its upper and lower sides by a series of hollow bronze bosses, each provided with a nail and hammered into the wood (e.g. Pl. 97A, 7). Two similar fragments were found by the back left wheel, and these were found to describe the arc of a circle, with a diameter of ca. 750 mm (Pl. 97A, 6; Fig. 201). The excavator interpreted these as the wooden felloes of the wheels, which were therefore decorated on both sides with hollow bronze knobs. Considering the cross-sections of these wooden fragments (Pl. 97A, 6.8), it is also possible that they constituted decorated wooden bands which were applied to the felloes. In the case of the fragment on Pl. 97A, 6, the wooden band could have been ca. 22 mm wide, and the felloe is preserved to a width of about 50 mm. It should be noted, of course, that the wooden remains from this grave are shrunken, and these measurements should be treated with caution.

At least 13 simple phalerae were found, made of thin bronze sheet, each provided with a large bronze nail. Some of the bronze nails are still rooted in wood (e.g. Pl. 96, 18.23). Four phalerae were found near the NE wheel, two near the NW wheel, and at least seven near the SE wheel. The phalerae may have served to decorated the sides of the wagon, but their location near the wheels may imply that they were fixed at the corners of the wagon-box. Near the NE wheel were found four (possibly more ?) bipartite discs with triangular openwork decoration and a raised central boss (Pl. 96, 11–14). These were found close to bronze-clad wooden fragments (Pl. 96, 15–17) and together they may have embellished a construction at or on the rear of the wagon-box (e.g. Fig. 202).

Finds:

- 1) Four complete conical bronze nave sheathings and three fragments. The nave sheathings are decorated with three or four groups of three ribs. Probably belonging to the nave sheathings are 13 fragments of ribbed bronze strips (Pl. 96, 1–10). The outer nave sheathing of the SE wheel lay on one of the fragments of decorated felloe (Pl. 97A, 8) and bears its imprint (Pl. 95B, 4). (Pls 95B; 96, 1–10)
- 2) At least 24 fragmentary bronze 'wedges'. Some carry slight engraved linear decoration. The 'wedges' are of various sizes. (Pl. 96, 24)

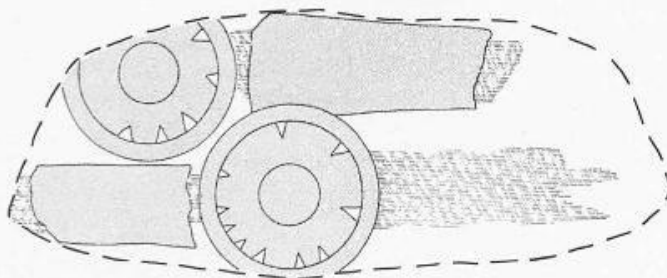


Fig. 202 Wehringen, 'Hexenberg', tumulus 8: detail of bronze fittings and wood found in situ. – Scale ca. 1:3.

- 3) Fragments of wooden felloes, decorated with hollow bronze round nailed knobs, each 16–17 mm in diameter. (Pl. 97A)
- 4) Fragments of at least 13 bronze phalerae, made of thin bronze sheet and provided with a large central nail, diameter originally ca. 100 mm. Some of the phalera nails are still rooted in wood. (Pl. 96, 18–23)
- 5) Fragments of wood clad with bronze sheet. These were found near the NE wheel, in conjunction with the openwork-decorated bipartite discs. (Pl. 96, 15–17)
- 6) Three complete and two fragmentary bronze bipartite discs with openwork triangular decoration and a raised central boss. The rim of the phalerae was formed by a separate bronze ring with triangular cross-section. On one of the rings (Pl. 96, 13) a nail hole is visible, suggesting that the discs were affixed to a (wooden?) base by nails. Diameter 70–80 mm. (Pl. 96, 11–14)
- 7) 21 pottery vessels. (Figs 98–9)
- 8) Small cup of gold sheet with embossed decoration, diameter 91 mm. (Fig. 98; Krahe 1963, pl. 13)
- 9) Bronze sword and bronze winged chape. (Fig. 97)

Museum: Römisches Museum, Augsburg.

146 Wehringen, 'Hungerbrunnenmähder', tumulus 1
(Kreis Augsburg, Reg.-Bez. Schwaben)

References: Uenze 1971, 178. Unpublished excavation report by K. H. Henning, dated 1969, in the Bayerisches Landesamt für Denkmalpflege, Augsburg ('Bericht über Rettungsgrabungen ...').

Description: This was a large tumulus (diameter 38 m, height 0.6 m), occupying an isolated position in the 'Hungerbrunnenmähder', but only 400 m N of a group of ca. 20 smaller tumuli (diameters ca. 15 m). Excavations, by the Bayerisches Landesamt für Denkmalpflege, Augsburg, took place in 1969, and found a central grave. The wooden grave chamber had left no traces but, according to the lay out of the grave goods, the excavator estimated that the chamber measured ca. 4.2 × 4.2 m (Fig. 203). The E side of the chamber was indicated by a row of six pottery vessels and two bronze broad-rimmed bowls ('Breitrandschalen') and according to this, the chamber was orientated roughly NNE-SSW. In the SW corner of the chamber were some fragments of bronze and iron horse-gear. N of the horse-gear were the iron remains of a wagon. Between the

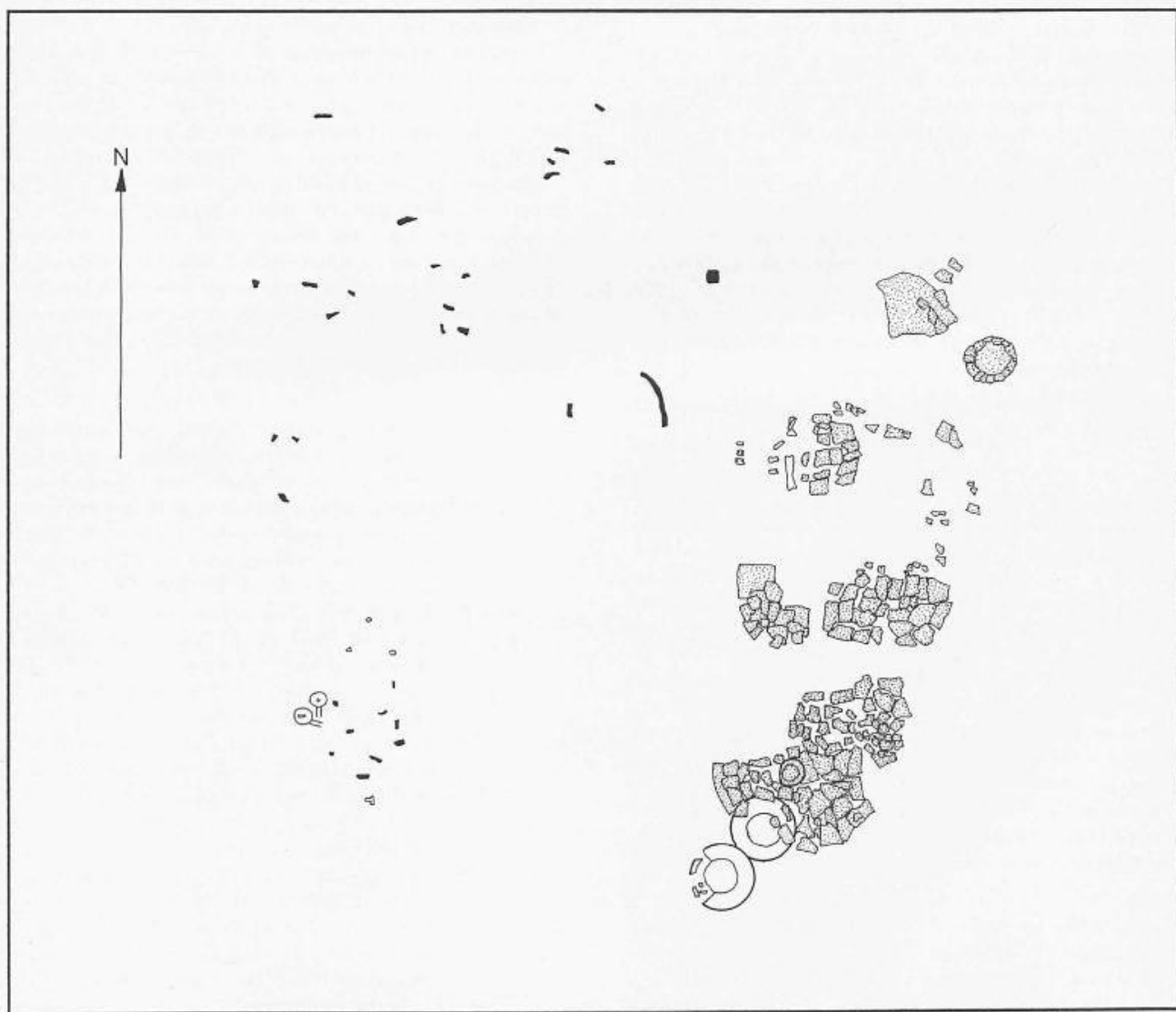


Fig. 203 Wehringen, 'Hungerbrunnenmähder', tumulus 1: plan of the central grave (iron: black; pottery: stippled; bronze and animal bone: linear). — Scale 1:40.

wagon remains and the row of pots was a small collection of animal bones. No traces of a human burial were found.

Comments: The iron objects from this excavation were in a very poor condition, and had not been restored when studied by the author. For that reason, the exact quantities and descriptions are necessarily lacking in precision.

Find:

- 1) Numerous small fragments of iron tyres. The cross-section of the tyres seems to be roughly 'C'-shaped, with a width of 29 mm or more. One tyre fragment appears to preserve a long nail head (Pl. 97B, 14). Another tyre fragment preserves the wooden socket of a spoke, measuring 38 x 11 mm (Pl. 97B, 1). Some of the tyre nails exhibit diagonal wood grain (Pl. 97B, 7). (Pl. 97B, 1.6-7.14)
- 2) Various fragments of iron nave-head rings with curved cross-section, and transverse wood grain. (Pl. 97B, 4-5.10)
- 3) Several fragments of iron sheet bearing traces of wood grain, probably remains of felloe-clamps. (Pl. 97B, 2-3)
- 4) Several fragmentary iron rings with square cross-section.
- 5) Iron fragments of uncharacteristic form.
- 6) Two bronze phalerae. (Pl. 97B, 11)
- 7) Numerous (at least 23) small looped bronze rein-knobs. These were originally fitted on reins which ran from the two bronze phalerae. Most of the rein-knobs could not be preserved. (Pl. 97B, 8-9)
- 8) Two bronze ring-footed rein-knobs. (Pl. 97B, 12)
- 9) Fragmentary bronze object. (Pl. 97B, 13)
- 10) Fragmentary bronze toggle. (Pl. 97B, 15)
- 11) Six pottery vessels.
- 12) Two broad-rimmed bronze bowls (*Breitrandfußschalen*). The bowls have a rolled-over rim. The rim is decorated with large bosses, each surrounded by a ring of nine point-bosses. Near the outer edge of the rim is a simple rib and on each side of the decorative field of the rim is a row of point-bosses. The bases of the bowls have a step-like depression. This fits into the opening of the hemispherical foot.
- 13) Animal bones and teeth.

Present location: Bayerisches Landesamt für Denkmalpflege, Augsburg (metal finds, inv. nos 47160-47174).

147A-B Weismain - Görau, 'Flurabteilung Rangen', tumuli 1 and 3

(Kreis Lichtenfels, Reg.-Bez. Oberfranken)

References: Köstler 1896, 122; Reinecke 1905a, 142; Radunz 1967, 3-15; Radunz 1969, 92-98; Abels 1985, 82-83 and note 18. Unpublished manuscript by F. Klopffleisch, dated 1. X. 1880, in the Friedrich-Schiller-Universität, Jena. Unpublished notebook by L. Zapf, dated 8. VI. 1881, in the Prähistorische Staatssammlung, München. Unpublished manuscript by Vollrath, dated 1881-2, in the Prähistorische Staatssammlung, München. Unpublished manuscript by P. Reinecke, undated, in the Prähistorische Staatssammlung, München ('Grabhügel-funde von Görau'). Unpublished manuscripts in the Bayerisches Landesamt für Denkmalpflege, Bamberg.

Description: This cemetery of eight tumuli was the subject of excavations in the late 1870s and early 1880s. Five of the tumuli were excavated by Vollrath and Zapf in 1879 and 1880.

A report of the excavation of tumulus 1 is to be found in a notebook written by Zapf, dated 8. VI. 1881: 'At a depth of about 3' (0.876 m), fragmentary iron tyres with large-headed nails were found. These tyre fragments, badly damaged by rust, lay in oval shapes Alongside were remains of four nave-caps.

By the tyres was (a medieval sickle) ... immediately under the tyres, in the inside of which were traces of the wood to which they had been nailed, were some flat pieces of bronze sheet, with point-boss decoration, which lay on rotten wood, and immediately crumbled to pieces when they were removed. The largest piece of bronze sheet measured 1 square inch (29.2 x 29.2 mm). A little deeper were found some bones and among them a fibula. Another fibula and a piece of bronze wire with two beads (of a chalk-like substance, Reinecke thought they were probably coral beads) lay a little deeper'.

The excavation of tumulus 3 was described by Vollrath in a letter to Prof. Ranke, dated 10-11. VI. 1881: 'This tumulus was particularly large. At a depth of 2-3' (0.584-0.876 m) iron tyres were found once again, as in tumulus 1. The tyres, lying in oval shapes, are exactly the same as those already described ... Under and by the tyres were numerous bones ... (In the same grave were found that winter) ... nine neck-rings and a few fragments of ear-rings. Inside the innermost neck-ring was a piece of skull bone ... (Next spring they excavated again and found) ... little pieces of bronze sheet, which seem to have been nailed to a round object ... little nails still stuck in the bronze sheet, hammered into the wood which was found under them ... Do these little pieces of bronze sheet belong with the iron nave-caps which lay close by? When we excavated a little further to the N, 20 arm-rings and a serpentine fibula were found. According to the position of the nine neck-rings and the 20 arm-rings, the skeleton must have lain (head) W-E(feet), with the arm-rings on the left arm. None of the pottery vessels could be removed completely'. Vollrath found another tyre fragment and an arm-ring in the same tumulus in March 1882.

The next person to excavate in this cemetery was Prof. F. Klopffleisch, from Jena; he visited Görau on the 1.X.1880 and described the finds from the five tumuli so far excavated by Vollrath and Zapf, i.e. tumuli 1-5 (Radunz 1967, 7-8). The objects sketched by Klopffleisch were sent to the museum in Munich (except for the pottery which has been lost), and have recently been published by Radunz (1969). The contents of tumuli 1-5 can now be reconstructed:

- Tumulus 1:** Iron tyre fragments with large-headed nails; remains of four iron nave-caps; medieval sickle; small pieces of bronze sheet with point-boss decoration ('crumbled to dust immediately' and were not preserved); two fibulae (Pl. 99B, 1-2); bronze pin with head formed by two white, chalky beads, ?coral (Pl. 99B, 3).
- Tumulus 2:** Bronze belt-sheet with point-boss decoration (Radunz 1969, pl. 14, 17); a few bronze fragments, variously described as from a fibula or an ear-ring (ibid. pl. 14, 8-9); painted sherd, probably from a plate or open bowl. Graphited rim and neck, with red-painted triangle decoration on the inside of the neck (sketch by Klopffleisch); further pottery fragments, including a base sherd with impressed 'rosette' decoration (sketch by Klopffleisch).
- Tumulus 3:** Iron tyre fragments of type VII with large nail heads of type E (Pl. 98, 15-16); bronze sheet fragments with rivet-holes (Pl. 98, 4-14); iron nave fittings (Pl. 98, 1-3); nine solid engraved neck-rings (Pl. 99A, 6); a few ear-rings (Pl. 99A, 1-5); 20 arm-rings (Pl. 99A, 8-16); serpentine fibula (Pl. 99A, 7); sherds, lost.
- Tumulus 4:** Numerous pottery vessels; a green-stone implement.

Tumulus 5: Two bronze foot-rings (probably Radunz 1969, pl. 12, 3); end fragment from a green-stone axe.

Comments: Tumuli 1 and 2 both contained a pair of fibulae, which were not closely described in the excavation reports. However, the pair from tumulus 2 were described as 'von großer Schönheit', which must refer to the pair of decorated drum fibulae (Radunz 1969, pl. 14, 1–2), rather than the plain arched fibulae (Pl. 99B, 1–2) which were passed over without special comment (tumulus 1). As for the wagon remains, the surviving bronze sheet fragments (Pl. 98, 4–14) certainly come from tumulus 3. The surviving iron tyre and nave parts cannot be assigned with assurance to either tumulus 1 or 3. However, in one letter Vollrath writes concerning the iron wagon finds: 'Wir legten gar kein Gewicht auf sie, legten und warfen sie bei Seite, ... Ich suchte eben nach Bronze und glaubte, daß Gegenstände aus Eisen in Hünengräber gar nicht vorkommen und, daß sie, wo sie sich finden, einer weit späteren Zeit zugehören'. Thus, one may conclude that when he first found iron fragments (in tumulus 1), thinking that they were modern, he neglected to keep them; but when he found similar fragments again in tumulus 3, he realised that they were indeed ancient and collected them. Following this reasoning, the surviving tyre and nave-fittings most likely come from tumulus 3 (Pl. 98, 1–3, 15–16).

Wagon finds:

- 1) 11 fragments of iron tyres, width 30–33 mm, with shallow curved cross-sections. The nails have large flat heads, squarish or irregular in outline, measuring 15–20 × 15–20 mm. The nail shanks themselves are rather thin and are only preserved to a maximum penetration of 36 mm. The nails were driven in every 88–130 mm. The diameter of the tyres can be estimated at 1.02–1.14 m. The fragments are all from the same type of tyre (type VIIIE). Probably from tumulus 3. (Pl. 98, 15–16)
- 2) Three fragments of iron nave-sheathings. Two of the fragments comprise nave-caps with an external diameter of 125 mm and an axle-channel diameter of 58 mm. The third fragment is from a conical nave-neck sheathing, with one rib in the middle. Maximum diameter 124 mm, minimum diameter 114 mm. Probably from tumulus 3. (Pl. 98, 1–3)
- 3) 10 fragments of curved bronze sheet, some with nail holes. The fragments have a fairly uniform length of 38–42 mm. The surviving fragments definitely came from tumulus 3 (those from tumulus 1 bore point-boss decoration and measured only about 30 × 30 mm; Vollrath expressly stated that while those from tumulus 1 'unter den Händen zermürbte', those from tumulus 3 'in kleinen Blättchen zu Tage kam'). (Pl. 98, 4–7, 9–14)
- 4) Four bronze nails, square in cross-section. Maximum length 13 mm. The nails originally belonged to the curved bronze fragments described above. (Pl. 98, 8)

Museum: Prähistorische Staatssammlung, München (wagon finds: inv. nos 1001–1008, 1011–1030, 1034, 1035, 1037, 1038 and 1040–1043).

7 CZECHOSLOVAKIA

148 Býčí Skála Cave

(Habrůvka parish, okr. Blansko, Moravia)

References: Poulik 1969; Wankel 1970; Angeli 1970; Nekvasil 1981; Stloukal 1981; Kromer 1981; Barth 1987.

Description: The Býčí skála cave was excavated in 1872 by H. Wankel. The interpretation of his discovery is highly problematic, suggestions include: a princely grave, a vault or collective tomb; an evacuated community crushed by the collapsing cave roof; a sanctuary with votive offerings (Wankel 1882, 369ff.; Angeli 1970, 139ff.; Nekvasil 1981, 107ff.; Kromer 1981, 293f.). The archaeological deposit was covered by a thick layer of rubble which, according to a speleological study, derived from the collapse of the cave roof. On the floor of the cave were two large burnt deposits, a stone-paved area and a deposit of metal-working implements. Among other things, the rubble layer covered: remains of at least 40 human skeletons, animal bones, as many as 300 pottery vessels, numerous bronze vessels, a collection of metal-working tools and scrap metal, a very large quantity of carbonised grain, almost 200 bronze bracelets and ankle-rings, two iron daggers, glass beads, gold jewellery, hundreds of pottery spindle-whorls, fragments of textiles, a fine bronze pendant, a bronze helmet, a cast bronze bull figurine, iron knives and sickles.

The wagon remains come from at least five wagons, and seem to have been found on and in the larger of the two burnt deposits on the cave floor. They have recently been thoroughly published by F. E. Barth; full details of the wagon fittings are provided in Barth's publication (Barth 1987).

Comments: The author is very grateful for permission from Dr F. E. Barth, Naturhistorisches Museum Vienna, to use some of his drawings for publication here (Pls 100–104; 105, 1–2).

Although the Býčí skála deposit is included in the catalogue of wagon-graves, the author would like to stress that a purely funerary interpretation for the cave is very unlikely. Among other things, the burnt grain and the cup made from a human skull suggest a cult explanation. The five wagons from Býčí skála are included here because of their importance for the study of ceremonial wagons.

Wagon finds:

- 1) Wheel-type i, with a type Cannstatt nave, spokes and felloe covered in ribbed bronze sheet, and an iron tyre with round-headed nails (type VIID). The wheel had 10 spokes and a diameter of 820 mm (Pls 100–101).

The nave is fitted with five pieces of ribbed bronze sheet and two iron nave-caps. The nave-caps are of two different types, one cap provided with an outer collar 23 mm wide. The nave-head is 117 mm in diameter and bears six triangular ribs; the nave-neck is 98 mm in diameter bearing three ribs, and widens towards the nave-stock which has a diameter of 145 mm. The middle part of the nave is fitted with a piece of bronze sheet with rectangular openings for the spoke sockets (measuring 17–21 × 34 mm). On one side of four of the sockets, two, three, four or five filed notches can be seen. Around the rectangular sockets are worn round grooves from the bronze spoke sheathings; these are 40–45 mm in diameter. The spoke-bases almost touched each other. The nave was about 430 mm in length.

The wooden spokes, 280 mm long, were fitted with bronze collars, 37–41 mm in diameter, bearing two, three, or five ribs. The individual collars had no joins and must each have been beaten from single pieces of bronze sheet. The last segments, next to the felloe, are exceptional and have a seam joined by bronze nails. The ribbing on the spoke sleeves is irregular, and was designed to produce a spiral effect when the wagon travelled at a minimum speed of 14 km/hour. One of the ends of the spoke sheathings bears 10 filed notches, corresponding in type to the notches on the sides of the nave-stock sockets: it was necessary to

mark the naves and spokes in order to facilitate the assembly of the spokes in the sequence required to produce the spiral effect.

The felloe was covered with rectangular sheets of bronze decorated with small bosses. Three types of bronze sheet were used, to ensure that every visible join was covered by a row of bosses. The felloe coverings were so fine and fragile that the cross-section of the felloe had nowhere been exactly preserved.

The tyres were flat in cross-section (width 38–40 mm) and had round-headed nails. One fragment has two nails set 117 mm apart.

- 2) Wheel-type ii, with a nave of type Cannstatt, spokes and felloe covered with iron sheet, and tyres of type VIIF. Barth has reconstructed a wheel with 10 spokes and a diameter of 800 mm (Pls 102–3).

The nave fittings survived only fragmentarily and we owe the reconstruction to F. E. Barth. Each end of the nave has an iron nave-cap 125–133 mm in external diameter, with an internal diameter of 50–60 mm. The nave-head and nave-neck were covered with ribbed iron sheet. The iron sheet bears alternating large and small ribs; the large ribs have a complex profile. The nave-head is reconstructed with a length of 110 mm; the nave-neck is at least 51 mm long, and is provided with a flange 11 mm high, serving to join the nave-neck and nave-head fittings. The iron sheathing between the nave-neck and the nave-stock has not been preserved. The centre of the nave-stock was covered with an iron band (ca. 70 mm wide) provided every 15 mm with pipe-like spoke sockets, 16 mm high. Barth estimated that the diameter of the nave-stock would be 150 mm for a 10-spoked wheel.

The spokes were covered with iron tubes 35–39 mm in diameter. The tubes were each made from a rectangular iron sheet held together by small iron nails. Each spoke is provided with three ribbed iron collars spaced 109–110 mm apart. According to Barth, the spokes were 230 mm in length.

Attached to one of the spokes is a small undecorated fragment of iron felloe-covering. Barth suggests that the felloes were covered with those iron felloe-coverings (see wheel-type iii) which have profiled iron bands covering the joins – presumably because the profiled bands are similar to the profiled spoke collars of wheel-type ii. The felloes are covered with rectangular or hour-glass shaped iron sheets, which were bent over the top of the felloe and nailed on. Only then was the tyre fitted. The height of the wooden felloe is estimated at 53 mm.

The tyres were 35–40 mm wide with a flat cross-section. The nails had large square nail-heads, set diagonally to the tyre and spaced 100–140 mm apart.

- 3) Wheel-type iii, with decorated bronze spoke coverings, iron felloe coverings and iron tyres of type VIIF. Barth suggests a wheel ca. 800 mm in diameter with 10 spokes (Pl. 104).

The felloe coverings are exactly the same as those of wheel-type ii (iron sheets with the joins covered by profiled iron bands). One felloe fragment preserves remains of decorated bronze coverings.

The spokes were each covered by three bronze tubes, 36 mm in diameter, with a total length of 260 mm. Each tube segment is decorated with repoussée lines and point-bosses. The ends of the tube segments are covered by iron collars, with a central rib flanked by repoussée lines and point-bosses.

Barth suggests that these spoke and felloe fittings and

tyres belonged to a nave covered with undecorated bronze sheet (type Cannstatt; Pl. 105, 1). The bronze nave fittings were badly damaged in a museum accident, and it is necessary to rely on Barth's reconstruction. Each nave has a shallow step on its outer side to accommodate the end of the bronze nave-head covering. The external diameter of the nave-cap is about 120 mm, with an axle-channel 48–53 mm in diameter. Very little of the nave-head covering remained, and it was impossible to estimate its original length. The nave-neck was better preserved and had a diameter of ca. 97 mm. Both the front and the rear of the nave-neck covering were stepped in profile. No fittings survived from the central part of the nave-stock (Pl. 105, 1).

- 4) Concerning Barth's reconstructions, it is important to note that the iron felloe fittings with profiled iron bands (wheel-types ii and iii) are only definitely associated with the spokes of wheel-type iii. The spokes of wheel-type ii only preserved a small fragment of iron felloe covering, and this was not certainly of the same type as that associated with the spoke coverings of wheel-type iii. The nave of Barth's wheel-type iii was not definitely associated with any other wheel fittings and it is not known what sort of spokes, felloes, or tyres it had. There is another fragment of a Cannstatt nave which could belong to the spoke and felloe fittings of Barth's wheel-type iii. This has ribbed decoration which is not dissimilar to the iron collars of the spokes. It comes from the front edge of the nave-stock. The nave-stock sheathing is decorated with round and triangular ribs. The fragment is rusted to a hemispherical bronze boss. For convenience, the fragment will be referred to as wheel-type iv (Pl. 105, 7). If this nave fragment belongs to the spoke and felloe fittings of wheel-type iii, then the spoke fittings on Pl. 105, 4–5 could belong to the same wheel as the undecorated bronze nave fittings (Pl. 105, 1).

Various other fittings survive, which cannot be assigned to any of Barth's wheel reconstructions:

- 5) 19 fragments of iron nave-caps, with a conical shape, each with a central rib. The external diameter measures ca. 110 mm. The fragments seem to indicate the existence of at least three Breitenbronn naves. For convenience, these fragments will be referred to as wheel-type v. (Pl. 105, 2)
- 6) Iron nave-caps similar to those used, for example, on wheel-type ii:
 - (i) external diameter 115 mm, axle-channel 55 mm in diameter.
 - (ii) external diameter 110 mm, axle-channel 49 mm in diameter.
 - (iii) external diameter 120 mm, axle-channel diameter 62 mm.
 - (iv) external diameter 120 mm, axle-channel 56 mm in diameter.
 - (v) axle-channel 55 mm in diameter.
 - (vi) axle-channel 55 mm in diameter.
 - (vii) axle-channel 43 mm in diameter.
- 7) Fragmentary bronze covering for a wooden board ca. 110 mm high, ca. 27 mm thick, and with a decorative sequence which can be reconstructed for a length of 680 mm (for the idealised profile see Pl. 105, 8). The outer 17 mm of the top and bottom of the front side of the board are raised 4 mm. The decoration of the bronze sheet covering is divided into six horizontal zones (Pl. 105, 8, A–F). The top of the board (A) is decorated with a row of hollow bosses, and the edges of the bronze covering have repoussée ribs (Pl. 106, 1–3). The next zone of decoration (B) is formed by a row of

repoussée ducks (Pl. 106, 1.5–6). There follows a step 4 mm in height, down to a row (C) of repoussée dots-and-circles (Pl. 106, 4–6). The main decorative zone, 47 mm wide, occupies the middle of the board (D), which is divided into 120 mm wide fields, in which three different motifs are preserved, alternating with a triple ring-boss motif, 32 mm in diameter (seen in fragments on Pl. 106, 6). The motifs are (i) a pair of 'H'-shaped designs executed in repoussée 'ladders' (Pl. 106, 5), (ii) two rows of five ring-bosses, 18 mm in diameter (Pl. 106, 6), (iii) a pair of swastikas, executed in repoussée 'ladders' (Pl. 106, 4). The next decorative zone has a row of repoussée dots-and-circles (E). The bottom zone of the decorative bronze sheet (F) has a row of bosses 9 mm in diameter (Pl. 106, 6). The bronze sheet covering was fastened to the wooden board by bronze nails with hemispherical heads.

- 8) Hemispherical bronze boss on a square base. The sides of the square base measure 86 × 95 mm. The boss is not exactly hemispherical, having an oval base measuring 66 × 81 mm. It has four nails, one at each corner, with spherical bronze heads and iron shanks. The sides of the square base are raised in a half-cylindrical rib. (Pl. 105, 9)
- 9) Iron hemispherical knob pierced by an iron nail with a spherical head. (Pl. 105, 3)
- 10) Flat iron ring ca. 67 mm in diameter, with an internal diameter of ca. 40 mm. The back of the ring has traces of horizontal wood grain. Three iron rings are rusted to the front of the flat ring, each ca. 43 mm in diameter. They seem to have been held together by a smaller iron ring. Among the rings it seems possible to see the end of an iron omega-clip. (Pl. 105, 6)

Museum: Naturhistorisches Museum, Wien; Moravské Muzeum, Brno.

149 Dolany

(okr. Plzeň-sever, Bohemia)

References: Píř 1900, 138; Franc 1906, pl. 35; Dvořák 1938b, 69; Šaldová 1968, 322 and 353, fig. 27, 4.

Description: Franc described some finds from the excavations of F. Kříkava in a group of tumuli at Dolany, and stated that these objects belonged together. He listed an iron sword with bronze chape, an iron spearhead, fragments of iron tyres and a pottery vessel.

Finds:

- 1) Three fragments of iron tyres, ca. 24 mm wide, with a type II cross-section. The tyres originally had a diameter of about 780 mm. On one fragment two nails are preserved, spaced 210 mm apart. One nail head projects slightly above the level of the tyre and is rectangular, measuring 9 × 32 mm. (Pl. 107A, 1))
- 2) Iron sword with bronze chape. (Pl. 107A, 3)
- 3) Iron spearhead, originally preserved to a length of 460 mm. Lost.
- 4) Squat conical-necked vessel, graphited on the inside of the neck and on the outside of the vessel. The neck is decorated with incised hatched triangles; at the point of each triangle is a circular stamped impression. Height 152 mm, rim diameter 248 mm. (Pl. 107A, 2)

Museum: Archeologické sbírky Západočeské Muzeum, Plzeň (inv. nos 176 and 8709–8710).

150 Dýšina, tumulus 2

(okr. Plzeň-sever, Bohemia)

References: Kříkava 1883, 294–296; Píř 1900, 57; Franc 1906, 126–140; Dvořák 1938b, 69; Šaldová 1968, 323 and 362–363.

Description: A group of eight tumuli was excavated by F. Kříkava. Tumulus 2 was 1 m high and had a circumference of 40 m. Inside the tumulus was a stone core. Kříkava's report of the excavations does not give details about the plan of the (?central) grave. The tumulus contained two bronze vessels, an iron sword, rich horse-gear including yoke fittings and a quantity of pottery vessels, two of which contained cremated bones. Among the bronze sheet fragments was a fragment of ribbed nave-neck sheathing on a piece of wood, to which it was originally fastened by nails.

Finds:

- 1) Fragment of bronze nave-neck sheathing, comprising a band of bronze sheet 69 mm wide, decorated with three ribs. One end of the band is preserved, with five nail-holes and remains of one iron nail. The nave-neck sheathing fits onto a piece of wood which must represent a fragment of the wooden nave. (Pl. 108A)
- 2) Fragment of a bronze vessel, possibly a situla; the rim was strengthened by a lead wire. (Šaldová 1968, fig. 23, 14–15)
- 3) Fragment of a bronze broad-rimmed bowl; the rim is strengthened with bronze wire and carries embossed 'sun' and 'waterbird' decoration. (ibid. fig. 24, 31)
- 4) two fragments of an iron sword with three bronze rivets. (Kříkava 1883, pl. 15, 40)
- 5) Four curved bronze cheek-pieces. (Šaldová 1968, fig. 23, 1–4)
- 6) Eight bronze rings. (ibid. figs 23, 5–8; 24, 10–14)
- 7) Eight bronze rein-knobs, with central spike and four-spoked design; on the rear side are two crossed straps. (ibid. fig. 24, 3–5.8–9)
- 8) Small hemispherical bronze rein-knobs, each with a loop on the rear side. (ibid. fig. 24, 15–18.26–28)
- 9) Two bronze toggles. (ibid. fig. 24, 1–2)
- 10) Four bronze hemispherical ring-footed rein-knobs. (ibid. fig. 24, 24–25)
- 11) 30 small ribbed bronze rein ornaments. (ibid. fig. 24, 22–23)
- 12) Two four-sided rein sleeves, each with a central perforation. (ibid. fig. 24, 29–30)
- 13) Two bronze oval decorative plaques, each with a round-headed nail; probably from the ends of a wooden yoke. (ibid. fig. 24, 6–7)
- 14) Fragments of bronze openwork 'Jochschnallen' and yoke-strap terminals. (ibid. fig. 23, 9–13.20)
- 15) Fragments of leather from a wooden yoke. The leather is decorated with small and large bronze bosses arranged in zig-zag and diamond shapes. (ibid. figs 23, 17–19; 24, 19–20)
- 16) Fragmentary chain of small bronze rings. (ibid. fig. 24, 21)
- 17) Pottery vessels (lost).

Museum: Archeologické sbírky Západočeské Muzeum, Plzeň (nave-neck fitting: inv. no. 11269).

151 Hradenín

(okr. Kolín, Bohemia)

References: Dvořák 1935, 72–82; Dvořák 1936, 66–79; Dvořák 1938a, 59–83; Dvořák 1938b, 69–89; Koutecký 1968, 410–16.

Description: This cemetery was discovered during deep ploughing, and was immediately excavated by F. Dvořák. He was able to excavate 64 graves in an area measuring 900 × 400 m. They were apparently arranged in rows running NW–SE, but sadly Dvořák's plan of the cemetery is lost. Dvořák was able to publish 30 of the 64 graves before his death; information on 13 more graves was collated by D. Koucký from field notebooks. The Hradenín graves are of five main types: extended inhumation in a wooden chamber; crouched inhumation in a wooden chamber; un-urned cremation in a wooden chamber; urned cremation graves; cremation in a simple pit. Most of the chamber graves (the largest measuring 5.3 × 3.8 m) were probably covered by tumuli. However, tumuli only left definite traces in the case of four graves (Dvořák 1935, 74).

Stray finds from Hradenín in the Kolín museum include three linchpins with large heads in the shape of a double-axe (Pl. 107B).

151A No grave allocated.

151B Hradenín, grave 5

(okr. Kolín, Bohemia)

References: Dvořák 1935, 78–79; Koucký 1968, 411.

Description: This grave pit was orientated N–S and measured 3 × 4.05 m, with a depth of 1.28 m. 800 mm above the grave floor was a layer with cremated bone and a few sherds. The main burial, however, was on the grave floor. In each of the four corners of the grave pit was a post-hole (Fig. 204).

In the N half of the grave was an extended inhumation orientated (head)S–N (feet). Dvořák reports that 'near the legs were the decayed wooden remains of a vehicle'. Three linchpins were found in the SE corner. By the S side and in the S half of the grave was a collection of horse-gear, including iron horse bits, bronze rein-knobs, iron rings etc.

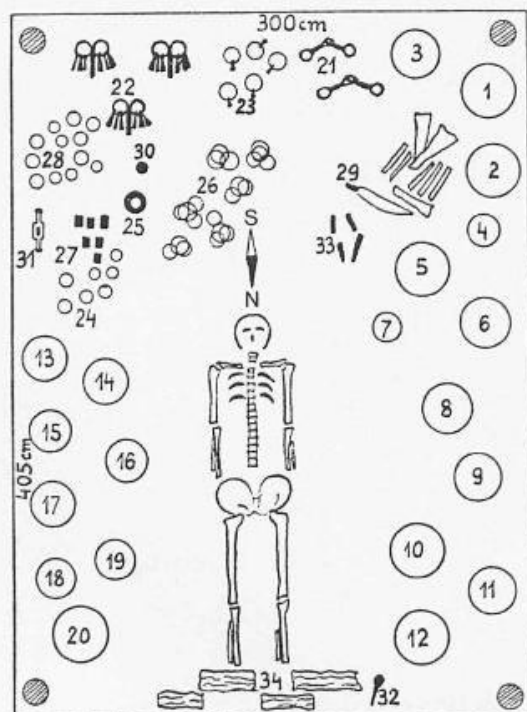


Fig. 204 Hradenín, grave 5: plan of the grave chamber (after Dvořák 1935).

The grave contained 20 pottery vessels, arranged along the long sides of the grave pit; in the SW corner were three storage vessels and close to them were the bones of a pig associated with a small iron knife.

Finds:

- 1) Three iron linchpins. The linchpins are of Bohemian type and have triangular iron pendants. (Pl. 108B, 1–7.9–11)
- 2) 11 fragments of flat iron discs 85 mm in external diameter, 35 mm internal diameter. Originally the discs each had three bronze rivets. (Three fragments on Pl. 108B, 8)
- 3) 12 iron triple-ring pendants. The pendants are of two sizes: (i) seven made of three iron rings (40 mm in diameter) hanging in a fourth ring of the same diameter. (Dvořák 1935, pl. 2, 18) (ii) five made of three iron rings (35 mm in diameter) hanging in a fourth ring 25 mm in diameter.
- 4) Two iron horse bits. (ibid. pl. 2, 27–28)
- 5) Seven iron rings (70 mm in diameter) each with a little looped iron rod with thickened head (length 35 mm). (ibid. pl. 2, 32–33)
- 6) Seven rectangular iron rein-knobs, 10 × 15 mm. (ibid. pl. 2, 24–26)
- 7) 21 bronze rein-knobs with central boss and broad flange, diameter 35–45 mm. (ibid. pl. 2, 17.19–20)
- 8) Iron button, 25 mm in diameter. (ibid. pl. 2, 23)
- 9) Iron toggle, 70 mm in length; the middle is swollen with a rectangular opening. The ends are spherical.
- 10) 38 iron rings, 15–50 mm in diameter. (ibid. pl. 2, 14.16)
- 11) Small fragments of iron rings.
- 12) Iron knife, length 85 mm. (ibid. pl. 2, 15)
- 13) Iron nail 30 mm long, and some fragments of further nails.
- 14) Fragments of wood 'from a wagon'. (ibid. pl. 2, 21)
- 15) 20 pottery vessels. (ibid. pl. 3, 3–18)

Museum: Regionální Muzeum, Kolín.

151C Hradenín, grave 18

(okr. Kolín, Bohemia)

References: Dvořák 1938a, 71–72; Koucký 1968, 412–3.

Description: This grave was orientated N–S and measured 2.85 × 5 m, with a depth of 1.38 m. 920 mm above the floor of the grave a step-like notch was cut into the walls – with traces of wood, presumably remains of the roof. In each of the four corners of the grave floor was a post-hole (Fig. 205).

The burial was in the N half of the grave, orientated (head)SE–NW (feet), lying on its right side with its legs slightly contracted. By its neck was an amber bead. There were two iron linchpins in the grave, in the NW and NE corners. In the SE corner of the grave was a pottery 'moon-symbol'; around it were fragments of horse harness and iron horse bits. In the SW corner were two large storage vessels and the bones of a pig, associated with an iron knife. In all, the grave contained at least five pottery vessels.

Finds:

- 1) Two iron linchpins, of which only one now survives. The design of this linchpin is more complicated than the normal Bohemian type. This example has two 'spectacle-shaped' iron bows, of which the smaller pair holds ring-pendants. (Pl. 108C, 2)
- 2) Flat iron ring, diameter 86 mm, width 18 mm. (Pl. 108C, 1)
- 3) Two iron horse bits. (Dvořák 1938a, 64, fig. 5, 12.17)
- 4) Two iron toggles. (ibid. 64, fig. 5, 8)

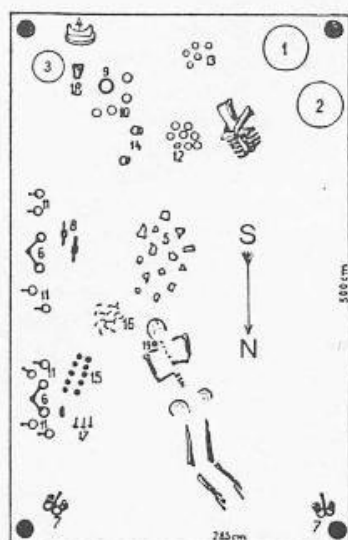


Fig. 205 Hradenín, grave 18: plan of the grave chamber (after Dvořák 1938a).

- 5) Four flat iron rings, diameter 55 mm. (ibid. 64, fig. 5, 10)
- 6) Eight iron rings with square cross-section, diameter 40 mm, each with a little iron rod with thickened end. (ibid. 64, fig. 5, 15)
- 7) Iron rings, diameter 40 mm (six examples), 30 mm (three examples), 25 mm (five examples) and 20 mm (one example).
- 8) Two iron double rings, each comprising two rings (diameter 30 and 40 mm), welded together at a right-angle. (ibid. 64, fig. 5, 16).
- 9) 10 knobs with disc-shaped bronze head (diameter 25 mm) and central iron rivet. (ibid. 64, fig. 5, 11)
- 10) 16 fragments of iron rings.
- 11) Three bronze nails.
- 12) One horse-tooth.
- 13) Amber bead, 23 mm in diameter.
- 14) Pottery 'moon-symbol', comprising a flat discoidal base (242 mm in diameter) and a four-sided 'horned' part (220 mm long and 62 mm high).
- 15) At least five pottery vessels (including Dvořák 1938a, 66, fig. 7, 6).

Museum: Regionální Muzeum, Kolín.

151D Hradenín, grave 24

(okr. Kolín, Bohemia)

References: Dvořák 1938a, 75–78; Dvořák 1938b, 69–78; Koutecký 1968, 413–4.

Description: This was a large rectangular grave orientated N-S, measuring 5.2 × 3.4 m, and 1.8 m in depth. 1.2 m above the grave floor was a step-like notch for the roof. Traces of wood from the floor of the grave chamber were recognisable, and four post-holes were found in the corners of the grave pit.

The burial was in the N part of the grave, orientated (head)S-N(feet) (Fig. 206). According to Dvořák, the body originally lay on the four-wheeled wagon – judging from the position of the surviving bones, which would have shifted out of place when the wagon collapsed. On the right side of the body was an iron ring and an iron sword with a blunt point, a pommel-tang and a hilt-

tang with three bronze rivets (Dvořák 1938b, 34, fig. 32, 1). Also on the right side of the body were two bronze needles (ibid. 28, fig. 26, 24) and a bronze 'spatula' (ibid. 28, fig. 26, 23). At the left shoulder were bronze tweezers. Three bronze rings were found by the right collar bone (ibid. 28, fig. 26, 16.17).

In the SW part of the grave was a collection of pig bones, an iron knife and a bronze socketed terminal, possibly from the knife-hilt (ibid. 28, fig. 26, 25 and 34, fig. 32, 2).

The grave contained 70 pottery vessels, in three main groups: 37 vessels in the S half at the E side; seven vessels in the S half at the W side (including two storage vessels in the SW corner); and 26 vessels near the N side (ibid. 29, fig. 27, 1–2; 30, fig. 28; 31, fig. 29; 35, fig. 33; 42, fig. 39, 1–2). In the SE corner was a pottery 'moon-symbol' (ibid. 33, fig. 31, 2).

By the E side of the S wall lay a wooden yoke, associated with remains of horse harness. Close to the yoke was a pair of iron horse bits with twisted shanks. Both of the horse bits had a pair of bronze cheek-pieces, each with three rectangular openings (ibid. 32, fig. 30, 3). Near these bits was a collection of rein ornaments, including bronze hemispherical rein-knobs (ibid. 28, fig. 26, 4–5), double rein-knobs (ibid. fig. 26, 26–31), ring-footed rein-knobs (ibid. 28, fig. 26, 10–11.13), bronze rings (ibid. 28, fig. 26, 16–21), a bronze toggle (ibid. 28, fig. 26, 22), and a pair of bronze double rings (ibid. 28, fig. 26, 2–3).

To the N of this harness was a third horse bit associated with a separate group of harness remains. This horse bit also had twisted iron shanks, but while one end had an iron ring, the other had an iron rein-hook (ibid. 32, fig. 30, 1). The rein ornaments included bronze hemispherical knobs (ibid. 28, fig. 26, 6–9.15) and bronze ring-footed knobs (ibid. 28, fig. 26, 14).

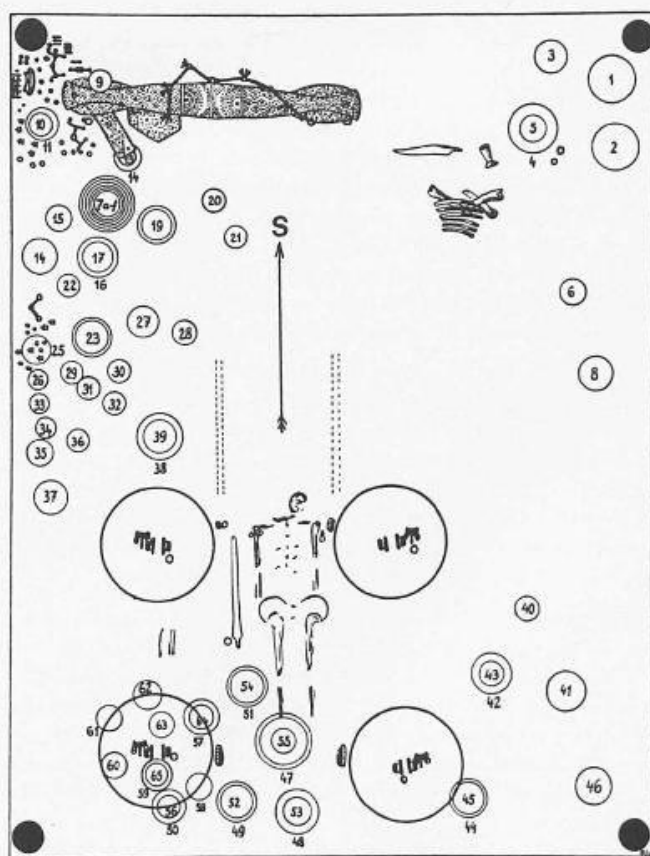


Fig. 206 Hradenín, grave 24: plan of the grave chamber (after Dvořák 1938b). – Scale ca. 1:50.

The wooden yoke was 1.26 m long, comprising a middle part 220 mm long and two wings each 520 mm in length (ibid. 23, fig. 20; 25, fig. 23). The yoke was covered with leather and decorated with bronze nails with domed heads in three sizes (head diameters: 2, 4–5, and 8 mm). At each end of the yoke was an oval bronze fitting (45 × 55 mm) held by a bronze nail. The middle part of the yoke was bordered by two bronze sheet yoke-bands, 35 mm wide. On the middle part of the yoke was found a bronze chain pendant, with four chains, each 580 mm long. Each chain consists of four 120 mm long twisted looped rods. The joints between the links are adorned with triangular pendants. The four chains were fastened to a central bronze ring 60 mm in diameter, with four round loops. Each wing of the yoke had a broad leather strap, again decorated with bronze nails. Attached to the wings of the yoke were a few bronze and iron rings (including a pair of bronze double rings: ibid. 28, fig. 26, 1).

Dvořák provided an interesting discussion of the wagon remains (ibid. 72–74), and the following description is drawn from his report.

Some of the tyre fragments of the four-wheeled wagon still stood vertically in the layer of silt which had slowly entered the chamber before the roof collapsed. Owing to the position of the finds, Dvořák suggested that the front wheels of the wagon decayed before the rear wheels. He reported that the wheels were ca. 860 mm in diameter and had eight spokes, ca. 290 mm in length and rectangular in cross-section (ca. 35 × 35 mm). Each nave was fitted with four iron bands. The axles were 1.36 m in length and the round axle arms were 55–60 mm in diameter. Between the nave and the axle-tree was a flat iron ring 60 mm in diameter, to reduce wear. The end of each axle was perforated and provided with a large-headed linchpin. The wagon-box was made of planks averaging 22 mm in thickness. The box measured ca. 1.08 × 1.86 m. The box was ca. 400 mm high, except for the rear end, which was not provided with a wooden side. The tops of the sides of the box were furnished with a cylindrical wooden rod ca. 40 mm in diameter. The front side's wooden rod was covered with 10 bronze sleeves, 42 mm in diameter, of three different lengths (10, 25, and 30 mm). At the back of the wagon were iron nails and two bronze sheet bands (length 120 mm, width 18 mm), the ends of which each had three bronze nails. Dvořák wrote that the wagon had a simple longitudinal perch, rectangular in cross-section (ca. 60 × 50 mm), which was held to the box by iron nails.

Comments: From Dvořák's description of the wagon, it is apparent that much wood must have been preserved on the floor of the grave pit. It is impossible to judge whether he included elements of the wooden chamber in his reconstruction of the wagon. For this reason, his detailed description of the wagon, particularly when he seems to rely on wooden remains (e.g. his description of the spokes, the perch, and the sides of the wagon box), should be treated with caution.

Wagon finds:

- 1) 16 iron nave fittings. Eight of the fittings are ca. 45 mm wide and 96–101 mm in diameter (Pl. 109, 4–5); the other eight are 18–20 mm wide and 129–134 mm in diameter (Pl. 109, 3). The narrow bands were 'L'-shaped in cross-section and, according to *in situ* finds, were fitted to the nave-stock. The broader bands are cylindrical and sheathed either the nave-neck or nave-head – judging from their small diameters, probably the former. (Pl. 109, 3–5)
- 2) Four iron linchpins with heads in the form of a double-axe. The two lower corners of the heads were perforated and held pendent iron rings. The shafts of the linchpins were

square in cross-section and had an oval opening at their lower end. (Pl. 109, 2.6–8)

- 3) Four iron tyres, originally ca. 860 mm in diameter. The tyres were 22 mm wide, with a flat internal side and a channelled outer side (type 1a). The tyres were fitted with long-headed nails of type A (head length ca. 45–52 mm) spaced 80–90 mm apart. The nail-shanks bear traces of diagonal wood grain and Dvořák reports that, in his day, they survived to a length of 65–70 mm. On one tyre fragment diagonal wood grain from two adjacent plank segments can be seen, forming an angle of ca. 93.5°, which indicates that there were probably four plank segments on the wheel. (Pl. 109, 1)
- 4) Flat iron rings 60 mm in diameter, apparently fitted between the axle stocks and the naves (therefore presumably originally four rings). Lost.
- 5) 10 bronze sheet sleeves with point boss decoration, 42 mm in diameter; in three sizes, 10, 25, and 30 mm in length. Apparently they decorated the front side of the wagon-box. Lost.
- 6) Two bronze sheet bands, 18 mm wide and 120 mm long, fixed at each end by three bronze nails. Lost.
- 7) Iron nails used in the construction of the wagon-box and undercarriage. Lost.

Museum: Regionální Muzeum, Kolín (inv. no. 11. 383–386, 392–399, 401–403, 417–424 and 520–580).

151E Hradenín, grave 28

(okr. Kolín, Bohemia)

References: Dvořák 1938a, 79–82; Dvořák 1938b, 78–82; Koutecký 1968, 414.

Description: This grave was orientated N-S and measured 5.1 × 2.9 m with a depth of 1.6 m (Fig. 207). The grave floor had six post-holes, in the corners and in the middle of the long sides. In the SW corner were two large storage vessels and close by was a group of seven further vessels. To the N of them were the bones of a pig and an iron knife. In the SE corner was a single large vessel and a pottery 'moon-symbol' (Dvořák 1938b, 33, fig. 31, 3), surrounded by a collection of horse harness and yoke fittings. In total, the grave contained 10 pottery vessels (ibid. 29, fig. 27, 3–4; 42, fig. 39, 3–8).

The N part of the grave was occupied by a four-wheeled wagon. On it lay an extended inhumation, most likely originally orientated (head)S-N(feet), but dislodged by the collapse of the wagon or the chamber roof. Under the skull was a simple bronze neck-ring with spherical ends (ibid. 41, fig. 38, 12). By the right shoulder were a small bronze ring (15 mm in diameter) and three larger bronze rings (20 mm in diameter). To the E of the body was a bronze socket 40 mm long, terminating in a circular bronze disc bearing three small rings (Pl. 111A, 2). To the S of the inhumation, between the front wheels of the wagon, was a bronze bowl (ibid. 41, fig. 38, 17). The SE corner of the grave contained numerous remains of horse-gear, including three iron horse bits. Two of the bits were of the same type, with twisted iron shanks; the ends held iron rings (ibid. 43, fig. 40, 12.14). The third bit had an iron ring at one end, while the other end had an iron rein-hook (ibid. 43, fig. 40, 13). Between the horse bits and the wagon were eight bronze phalerae with ribbed decoration. One large phalera (95 mm in diameter) with three bronze rivets (ibid. 41, fig. 38, 11), was surrounded by seven smaller phalerae (80 mm in diameter) each with one bronze rivet (ibid. 41, fig. 38, 15–16). To the N were 14 bronze rein-

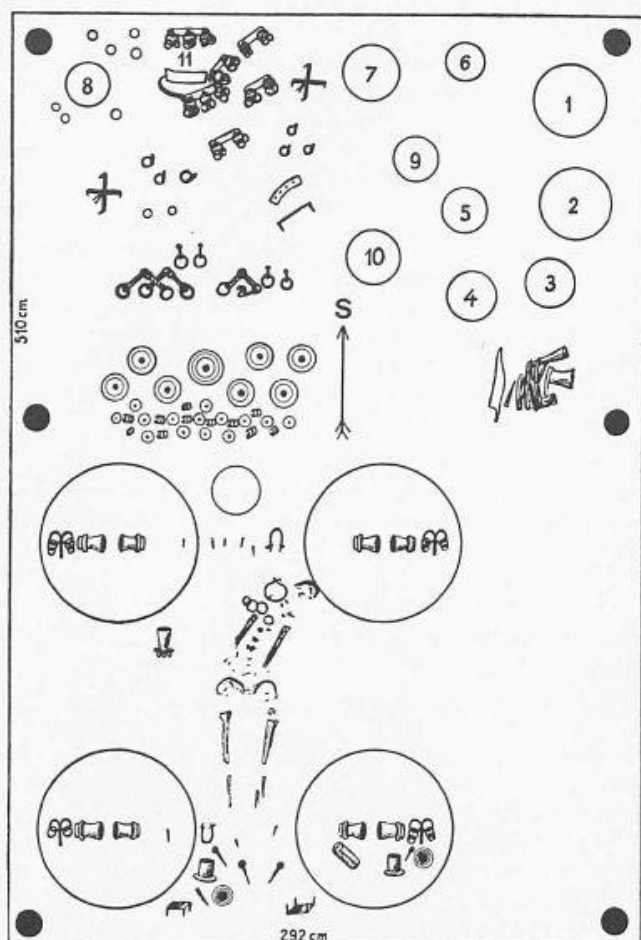


Fig. 207 Hradenín, grave 28: plan of the grave chamber (after Dvořák 1938b).

knobs, each with an iron rivet (ibid. 41, fig. 38, 13–14), and 11 bronze rein sleeves with transverse ribs (ibid. 41, fig. 38, 7–10).

The other group of horse-gear was found in the SE corner, mixed with other metal fittings which probably belonged to the yoke. These included six (?) rein ornaments, four of which were 45 mm long with two groups of pendent bronze rings held by iron rivets (ibid. 43, fig. 40, 1–2), the other two were 70 mm long with three groups of pendent bronze rings held by iron rivets (ibid. 43, fig. 40, 3–4). Also found was a flat iron ring, 76 mm in external diameter and 52 mm in internal diameter (Pl. 110, 2). 23 iron rings (20–45 mm in diameter) and two bronze rings (15 and 18 mm in diameter) and four iron rings 50 mm in diameter, each with a spherical-ended iron rod looped on (ibid. 43, fig. 40, 5) were also present. Eight iron double-rings probably belonged to the yoke; they were riveted together at right-angles to each other (ibid. 43, fig. 40, 9–10). Dvořák described a number of other enigmatic objects, including two cross-shaped iron fittings (cross-arm length 58 mm) each with a double nail. The undersides of the fittings carry traces of wood grain (Pl. 110, 14). He mentioned two iron 'hooks' (length 85 mm), both ends provided with iron nails. A bronze sheet band, 35 mm long, with one end bent into a 'knee-shape' also belonged to a group of finds in the SE corner of the grave, likewise a flat iron sheet fitting nailed to a thin bronze sheet strip (85 × 15 mm) which was decorated with transverse rows of point-bosses.

The wagon had four iron tyres 820 mm in diameter. The SE tyre was very well preserved and Dvořák was able to detect

important wooden remains (ibid. 37, fig. 34); he reported that the felloes were 70 mm high and 22 mm wide. There were six spokes, each 270 mm long and 30–35 mm wide. The naves were biconical and each was fitted with two conical metal sheathings. The end of each axle was perforated and was provided with a linchpin of Bohemian type. The wheel gauge measured 1.1 m and the wheel base was 1.76 m. The axles were apparently joined by a single perch, round in cross-section. Above each axle was a piece of wood with rectangular cross-section (described by Dvořák as '*Polsterhölzer*'), which was joined to the axle by a 'U'-shaped iron band (Pl. 110, 6.9). The wagon-box rested on these two pieces of wood ('*Polsterhölzer*'). The wagon-box consisted simply of three flat planks, 18–20 mm thick and 300–350 mm wide. At the back of the wagon they were joined together by two rectangular iron fittings (Pl. 110, 15–16). At the front they were simply nailed to the front '*Polsterholz*'. At the rear end of the wagon were metal fittings, which Dvořák thought came from a wooden seat. There were two disc-headed sockets, with discs 36 mm in diameter (Pl. 111A, 4–5), two profiled spools, 25 mm high, internal diameter 16 mm, external diameter 45 mm (Pl. 111A, 1), and four iron nails, 70 mm long, with round bronze heads (Pl. 110, 7–8).

Comments: Dvořák published a reconstruction drawing of this wagon, which corresponds with the description summarised above (ibid. 67, fig. 60). The reconstruction of this wagon, like that from grave 24, depends heavily on Dvořák's observations of wooden remains on the grave floor. Sadly, these are not described in enough detail to be sure that there was no confusion with wooden remains from the chamber construction.

Wagon finds:

- 1) The iron tyres had a type III cross-section, ca. 21 mm wide and 820 mm in diameter. The tyre nails were set 160–170 mm apart and had small rectangular countersunk heads (7 × 14 mm); only one nail head is exceptional and this has an elongated oval shape (Pl. 110, 3). The longest preserved nail had a penetration of 72 mm. Some of the nail shafts preserve wood grain, and it is always horizontal. (Pl. 110, 1.3–5)
- 2) The wooden naves were biconical and, according to Dvořák's measurements of the finds *in situ*, 440 mm in length. All but the nave-stock, 60 mm wide, was sheathed in bronze sheet. The nave-necks were fitted with conical bronze sheet sheathings; at the widest end there were two groups of two ribs and a group of three ribs. The seam of the nave-neck sheathing was covered by a bronze band 7 mm wide and held by bronze rivets. The nave-head was provided with a ribbed bronze nave-head ring, measuring 120–132 mm in diameter. This overlapped an iron nave-cap, which had an axle-channel 50 mm in diameter. (Pl. 110, 10–13.17)
- 3) Four iron linchpins of Bohemian type, with pendent iron rings. (Pl. 111A, 3.6–12)
- 4) Two fragmentary 'U'-shaped iron bands with nails at each end. The inner side of one of the bands bears horizontal wood grain. According to Dvořák these bands held the axles to the pieces of wood he called '*Polsterhölzer*'; they may, in fact, be felloe-clamps. (Pl. 110, 6.9)
- 5) Two rectangular iron sheet fittings, measuring ca. 57 × 37–40 mm. According to Dvořák, they held together the rear end of the wagon-box floor. One of the fittings has five nails, on the other only two nails survive. One of the fittings bears wood grain showing the join between two pieces of wood; the other shows a join between three pieces of wood. (Pl. 110, 15–16)

- 6) Four iron nails with spherical bronze heads (diameter 17-18 mm). One nail has a penetration of 73 mm and bears diagonal wood grain. (Pl. 110, 7-8)
- 7) Two bronze sockets, height 27 mm, terminating in a round disc, 36 mm in diameter. (Pl. 111A, 4-5)
- 8) Two bronze profiled spools, height 25 mm, external diameter 45 mm, internal diameter 16 mm. (Pl. 111A, 1)

Museum: Regionální Muzeum, Kolín (wagon-finds: inv. nos 7848; 11. 413-416, 425-430, 494, 591, 608-611, 643-645, 647, 654, 657 and 659-660).

151F Hradenín, grave 30

(okr. Kolín, Bohemia)

References: Koutecký 1968, 414 and 407, fig. 2b.

Description: This grave measured 4.5 x 3 m, with a depth of 1.4 m, and was orientated N-S. In the N half of the grave was an

inhumation positioned (head)S-N(feet), and there was a pile of cremated bone at the E side. At the E side there were also two horse bits and two linchpins; to the S were eight rein-knobs. There was more horse-gear at the S side, including two toggles and some iron rings. In the SE corner was a moon-symbol and a storage vessel; seven more vessels were arranged by the S part of the W side of the grave. In the middle of the S half of the grave were some pig bones and an iron knife.

Comments: This grave was not published by Dvořák. However, Koutecký was able to find a notebook with a sketch of the grave plan (Fig. 208), which forms the basis for the description above. The two linchpins were of Bohemian type, and are presumably among the eight surviving linchpins from Hradenín which cannot be assigned to any particular grave (seven of these have been drawn: Pl. 111B; 112A).

Museum: Regionální Muzeum, Kolín. Eight linchpins come into question; the undrawn linchpin has no inventory number, the seven other linchpins have the following inventory numbers: 11.190, 11.193, 12.262, 12.347, 12.350, 13.130, 13.138.

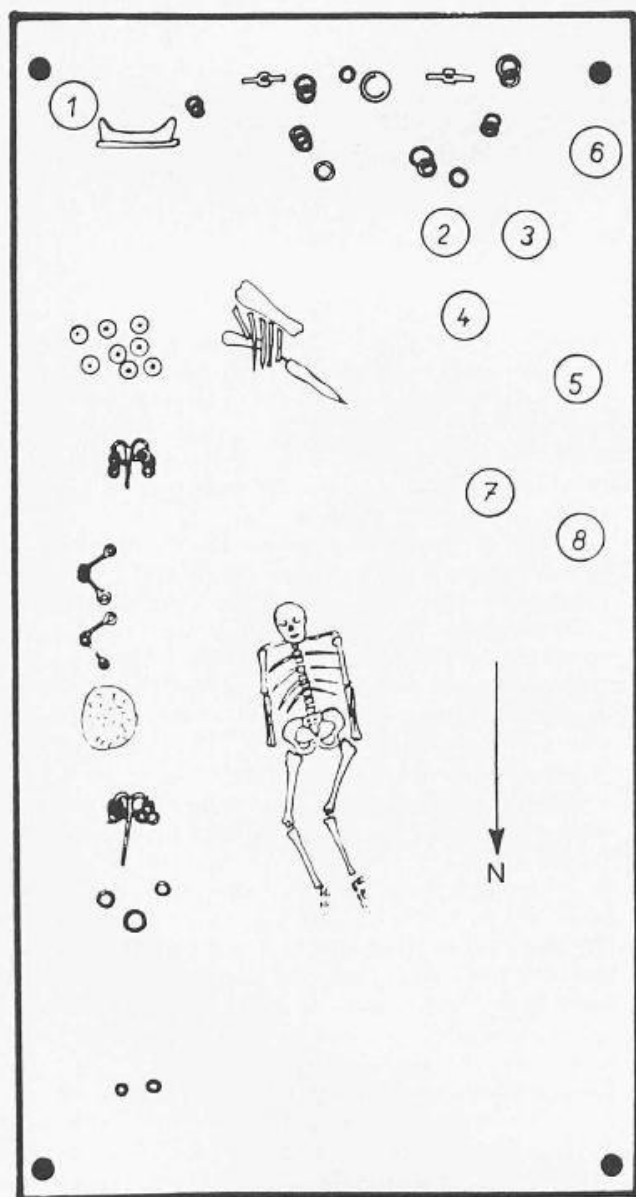


Fig. 208 Hradenín, grave 30: plan of the grave chamber (after Koutecký 1968).

151G Hradenín, grave 33

(okr. Kolín, Bohemia)

References: Koutecký 1968, 415 and 409, fig. 2d.

Description: This grave was formed by a rectangular pit orientated N-S. In the middle was an inhumation orientated (head)S-N(feet). By the head of the burial were three buttons and a piece of bronze sheet. In the S part of the grave was a collection of horse-gear, including two toggles and some rings. 10 vessels formed a row by the W side, and another vessel was found in the SE corner. By the W side there was also a 'moon-symbol'. Koutecký wrote that in the N part of the grave there were two to four iron linchpins, but only two are shown on Dvořák's plan.

Comments: This grave was not published by Dvořák. However, Koutecký was able to find a notebook with a sketch of the grave plan (Fig. 209), which forms the basis for the description above. The 'two to four' linchpins were of Bohemian type and are presumably among the eight surviving linchpins from Hradenín which cannot be assigned to any particular grave (seven of these have been drawn: Pl. 111B; 112A).

Museum: Regionální Muzeum, Kolín. The undrawn linchpin has no inventory number; the seven other linchpins have the following inventory numbers: 11.190, 11.193, 12.262, 12.347, 12.350, 13.130, 13.138.

151H No grave allocated.

151I Hradenín, grave 46

(okr. Kolín, Bohemia)

References: Dvořák 1938b, 82-88; Koutecký 1968, 415.

Description: This grave pit was rectangular, measuring 5.1 x 3.1 m with a depth of 1.6 m, and orientated N-S. The pit originally contained a hollow wooden chamber, as shown by the layer of muddy washed-in silt on the floor of the grave, and by remains of the timber roof (Fig. 210).

In the SE corner of the grave was a 'moon-symbol' and in the SW corner were two large storage vessels, both containing smaller vessels. A little distance away were some pig bones and

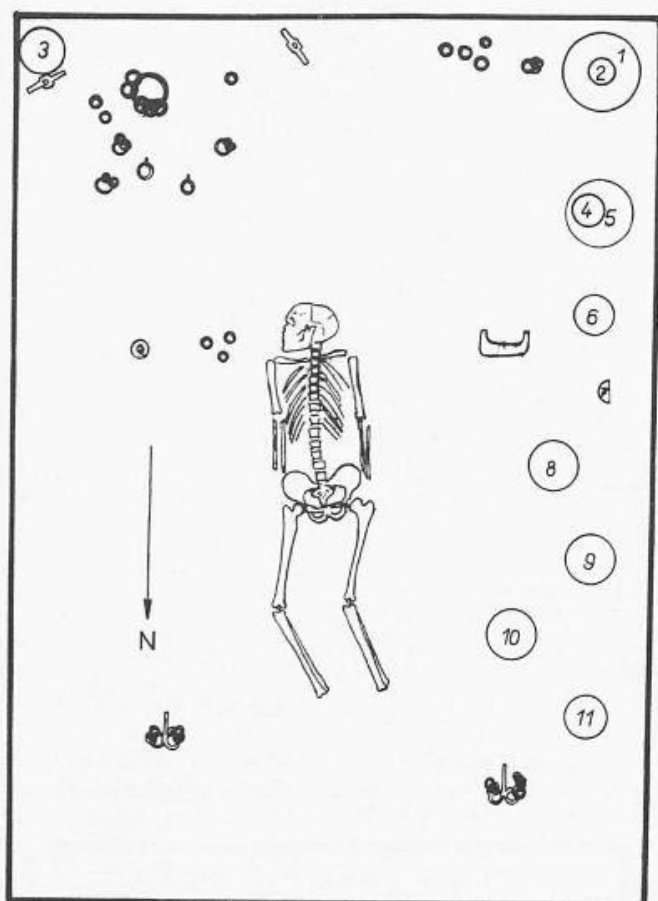


Fig. 209 Hradenín, grave 33: plan of the grave chamber (after Koutecký 1968).

an iron knife (Dvořák 1938b, 34, fig. 32, 3). Also in the SW corner was a cast bronze socket; another bronze socket was found in the middle of the grave, just SW of the wagon. At the S side was a wooden yoke, and horse-gear was found by the E side. In the NE part of the pit were the remains of a four-wheeled wagon, on which lay an inhumation originally orientated (head)S-N(feet). To its right was an iron sword, pointing to the S (ibid. 34, fig. 32, 4). On the left wrist was a bronze arm-band. By the right shoulder were five small rings, 15–20 mm in diameter, four of bronze and one of iron. The pottery vessels were arranged along the W side and in the N half of the pit, they numbered 40 vessels in total (ibid. 35, fig. 33; 51, fig. 46).

The horse-gear included three iron horse bits. Two of the bits were found together and were each provided with a pair of bronze cheek-pieces (ibid. 49, fig. 44, 16–17). The third bit had no cheek-pieces: one end of the bit had an iron ring 50 mm in diameter and an 'omega-clip', the other end had an 'omega-clip' and a rein-hook with leaf-shaped end. The horse-gear included the following bronze objects: two toggles (ibid. 49, fig. 44, 12–13), two looped rein-knobs with a slight flange (ibid. 49, fig. 44, 4), 221 small looped rein-knobs, six hemispherical looped rein-knobs, six ring-footed rein-knobs (ibid. 49, fig. 44, 2–3), eight large ring-footed rein-knobs with a central projection and loops around the rim (ibid. 49, fig. 44, 14, 19), four ribbed rein sleeves (ibid. 49, fig. 44, 6), eight perforated rein sleeves (ibid. 49, fig. 44, 5), 10 long double-looped rein ornaments (ibid. 49, fig. 44, 11), four similar long double-looped rein ornaments (ibid. 49, fig. 44, 10), one small double-looped object (ibid. 49, fig. 44, 9) and 14 bronze rings 15–20 mm in diameter.

By the S wall of the grave pit was a decorated wooden yoke (ibid. 23, fig. 21). The yoke had two 'wings', each 590 mm long, and a small central section; the total length of the yoke was 1.24 m. The surface of the yoke was covered with leather, which was decorated with small bronze knobs each provided with two tongues (in four sizes: diameters 2.5, 4, 7, and 10 mm). The bronze knobs formed rhomboidal, triangular, zig-zag, and circular motifs. The decoration was continued on the broad leather straps which project from under the yoke. On each end of the yoke was an oval bronze fitting, 40×50 mm, with a central spherical-headed bronze nail. The yoke was provided with a number of bronze rings with square cross-section, 20 and 35 mm in diameter. At each end of the yoke was a pair of bronze openwork 'Jochschnallen' (ibid. 50, fig. 45).

As in the case of graves 24 and 58 there was a 'chain-pendant' under the yoke. This example was made of iron. The centre of the pendant was formed by two superimposed concentric rings (30 and 60 mm in diameter); the smaller ring was held above the larger ring by four iron struts. At the base of each of the struts was a loop. Each of the loops held an iron chain made from four 110 mm long links. The links had a loop at each end and were held together by iron rings. The rings also each held three triangular iron pendants (ibid. 49, fig. 44, 1.8).

In the NE part of the grave pit were the remains of a four-wheeled wagon. Dvořák was able to detect interesting details of wagon construction, particularly from the well-preserved NW wheel. On this wheel, the felloe was 75 mm thick and had a width of 19 mm by the tyre, increasing to a width of 40 mm by the inner side. The felloes were fitted with two types of clamps,

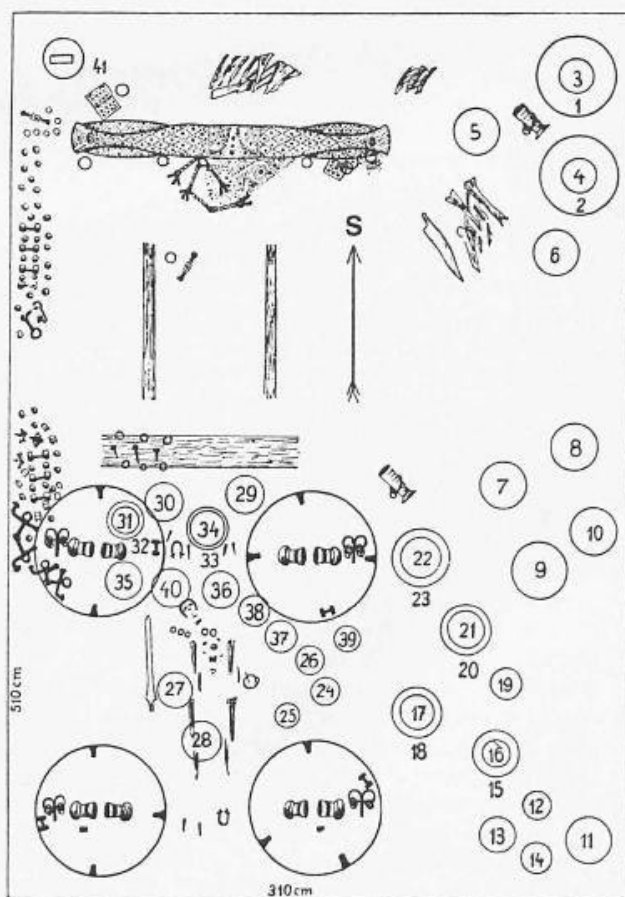


Fig. 210 Hradenín, grave 46: plan of the grave chamber (after Dvořák 1938b).

'Y'-shaped and 'I'-shaped. Dvořák wrote that each front wheel had two 'Y'-shaped clamps and each back wheel had three of them; however, his plan (Fig. 210) shows the SW wheel with three 'Y'-shaped clamps. Dvořák wrote that each wheel was also provided with one 'I'-shaped iron clamp, but more than five of these survive in Kolín museum. The wheels had eight spokes, which were about 290 mm long and about 30–38 mm wide. The diameter of the central part of the nave was 140–160 mm and the nave had a total length of ca. 340 mm. The iron tyres had a diameter of 800 mm and were each fitted with 20 nails.

The axles of the wagon were 1.55–1.66 m in length, fastened to the undercarriage by 'U'-shaped iron straps. The ends of the axles were perforated and held linchpins of Bohemian type.

Dvořák wrote that he was able to detect a piece of wood which would correspond to the 'perch' of the undercarriage. This was at least 2 m long and had a rectangular cross-section, measuring 62 × 56 mm. The wagon-box measured 2.6 × 1.1 m and had front and side walls. The floor of the wagon-box was made from planks 22–24 mm thick. Among the remnants of the front side of the wagon-box were seven bronze nails with flat round heads, which could have served as decoration. Furthermore, Dvořák found some thin bronze wires with bent ends (length 20–22 mm) which he thought could have decorated the front of the wagon. By the NE wheel was an iron cylinder, the function of which is unknown.

Between the yoke and the wagon were two parallel timbers, set 750 mm apart; they measured 1.20 m in length and 60 mm in width. Further to the N, in front of the wagon, was a layer of wooden planking with the grain running E-W. Some bronze nails and small rings were found among these boards (this could be Dvořák's 'decoration' from the front of the wagon, referred to above).

Comments: Sadly, as in the case of graves 24 and 28, Dvořák's description of the wagon construction is open to doubt. Particularly, his observation of the wooden remains may have been confused by remains of the wooden grave chamber.

Wagon finds:

- 1) Remains of four iron tyres, 800 mm in diameter. The nails are not always clearly visible on these tyre fragments, but the shortest distance measured between two nails was 126 mm. The tyres are about 19 mm wide and have a trapezoidal cross-section, with the inner edges overhanging. Most of the nail heads are countersunk, but a few have protruding, rather globular heads. (Pl. 112B, 2–4)
- 2) Remains of bronze and iron nave fittings, variant II of type Breitenbronn. The nave-neck is fitted with two bronze sheet bands and an iron sheet band. The iron bands are fastened by a pair of iron nails, and the bronze bands by a pair of bronze nails. The nave-head has an iron nave-head ring ca. 122 mm in diameter, and a hemispherical iron nave-cap with an axle-channel ca. 47 mm in diameter. (Pl. 113, 1)
- 3) Four linchpins of Bohemian type. The linchpins carry pendent iron rings. (Pl. 114A)
- 4) Nine iron 'Y'-shaped felloe-clamps and fragments of further clamps. Each end of the clamp is widened to a 'trumpet-shape', and fastened by two nails. The inner surface of the clamps bear traces of wood grain from the composite felloes, particularly showing joins between the spanned inner felloe and outer composite plank felloe. On three of the clamps the angle formed between the wood grain of adjacent plank segments can be measured: 147°, 119°, ca. 120°. This suggests that eight plank segments may have been used for each of the composite outer felloes. (Pl. 113, 2–11)
- 5) Five iron 'I'-shaped felloe-clamps and fragments of further

clamps. The inner surfaces of these clamps show traces of wood grain from the composite felloes. Joins are visible between the spanned inner felloe and the composite outer felloe. In three cases it is possible to measure the angle formed by the wood grain of adjacent segments of the outer composite felloe: 106°, 116°, 123°. This leads to an estimated number of 4.8, 5.6 and 6.3 felloe segments respectively. (Pl. 113, 12–16)

- 6) Simple iron strap, 25 mm wide, bent into a 'U'-shape, with a nail at each end. The inner surface of the iron strap bears a horizontal wood grain. (Pl. 112B, 6)
- 7) Two cast bronze sockets, with ribbed decoration. The sockets are terminated by shallow circular cups. Both of the sockets bear a bronze ring, through which is looped another bronze ring. (Pl. 112B, 1)
- 8) Iron cylinder, length 43 mm, diameter 28 mm. (Pl. 112B, 5)

Museum: Regionální Muzeum, Kolín (inv. no. 11. 432–437, 451, 457, 493, 499, 504 and 507).

151J Hradenín, grave 58

(okr. Kolín, Bohemia)

References: Koutecký 1968, 416 and 419, fig. 10.

Description: This grave pit was rectangular in shape, orientated N-S, and contained no traces of an inhumation or cremation burial. In the N part of the grave were four linchpins. In the SE part of the grave was a collection of horse-gear, including two

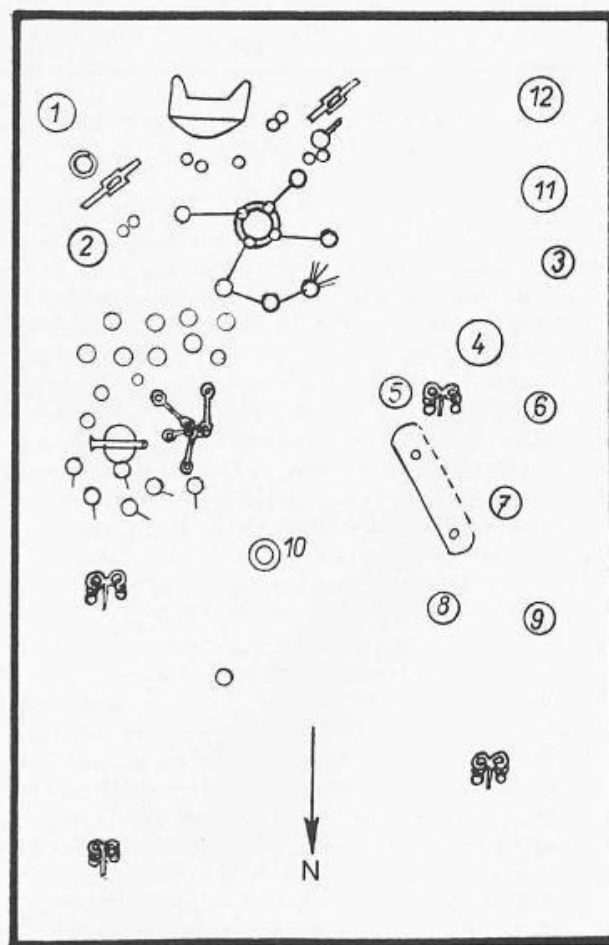


Fig. 211 Hradenín, grave 58: plan of the grave chamber (after Koutecký 1968).

horse bits, two toggles, rings and rein-knobs. In the middle of the S half was a 'chain-pendant', of the type known also from graves 24, 36, and 46. Among the horse-gear, near the middle of the E side of the grave, was an object of unknown function – possibly a tubular socket with a disc head. At the S side of the grave was a 'moon-symbol', and near the SW corner were some pig bones. In the SE corner and at the W side were 12 pottery vessels. In the middle of the grave, towards the W side, was a wooden board with two holes.

Comments: This grave was not published by Dvořák, but Koutecký was able to find a sketch of the grave (Fig. 211), which forms the basis for the description above.

Wagon finds:

1) Four iron linchpins of Bohemian type. (Pl. 114B)

Museum: Regionální Muzeum, Kolín (inv. no. 12. 476-479).

152 Kladruby

(okr. Rokycany, Bohemia)

References: Píř 1907a, 470-473; Dvořák 1938b, 68; Filip 1956, 267; Soudská 1976, 635-636.

Description: This tumulus had already been destroyed by agricultural activity when it was excavated by J. L. Píř. He found remains of a stone core, under which were finds spread over a distance of 3 m. The wheel remains were orientated N-S. To the N of the wheels were some bronze rein-knobs and three phalerae. Just to the N of these objects were some iron horse bit fragments, four bronze sockets and two iron rings. Between the wheel remains and the horse-gear was an iron knife. To the W was a single pottery vessel containing cremation and remains of a decorated bone disc. It is uncertain whether the in-urned cremation belonged to the central wagon-grave.

Comments: The grave finds can probably be assigned to the early La Tène period. According to M. Chytráček (1988, 52-3), the vehicle from Kladruby had two wheels.

Finds:

- 1) 13 fragments of iron tyres, 27-30 mm wide, with type VII cross-section. The nails were spaced 120-125 mm apart and had small square heads (type F). (Pl. 115, 8-9)
- 2) Fragments of bronze and iron nave fittings. The bronze sheet fragments are of two types, a cylindrical ribbed sheathing, ca. 96 mm in diameter, from the nave-head (Pl. 115, 1-2) and narrow bands, 8 mm wide, with an internal diameter of ca. 110 mm (Pl. 115, 5). One end of the nave-head sheathing was bent inwards, and one fragment preserves traces at this point of the iron nave-cap. Only two fragments of nave-caps survive, and they show that there was an axle-channel ca. 40 mm in diameter (Pl. 115, 6-7). Three fragments of iron bands, ca. 22 mm wide, could also have belonged to the nave construction (Pl. 115, 3-4). Pl. 115, 1-7)
- 3) Fragment of an iron linchpin. (Pl. 115, 10)
- 4) Six iron fragments, probably all originally from iron horse bits. The remains represent at least three complete mouthpieces. (Pl. 116A, 5-7.10-11)
- 5) Two fragmentary iron rings, ca. 30 mm in diameter. (Pl. 116A, 8-9)
- 6) Three fragmentary bronze phalerae. Two of the phalerae had spherical central bosses, the third had a flat central boss. The phalerae were about 90 mm in diameter, and were decorated with point-bosses and engraved dots-and-circles (Pl. 116A, 1). These phalerae are no longer to be

found in the Národní Muzeum, Prague. Instead, a single fragmentary phalera survives, lacking a central boss. Only the central undecorated part of the phalera is preserved, ca. 70 mm in diameter, the outer part seems to have broken off at the first ring of decoration. (Pl. 116A, 1-2)

- 7) Four bronze sockets with ribbed shafts and cup-shaped ends. Length ca. 35 mm. Probably terminals from organic cheek-pieces. Lost. (Pl. 116A, 3-4)
- 8) Hemispherical bronze rein-knobs, originally arranged on a leather rein, diameter ca. 26-42 mm. The knobs seem to have a central rivet on the rear side. Lost. (Píř 1907a, pl. 27, 1)
- 9) Three small bronze nails. (Pl. 115, 18-20)
- 10) Two hemispherical bronze sheet knobs, each with a central perforation. (Pl. 115, 16-17)
- 11) Bronze rivet with fragmentary flat head. (Pl. 115, 14)
- 12) Bronze nail with flat circular head, originally nailed to bronze sheet, of which a fragment survives. (Pl. 115, 13)
- 13) Flat bronze ring. (Pl. 115, 15)
- 14) 10 iron fragments, mostly probably nails (including Pl. 115, 12).
- 15) Fragments of a large iron knife, length more than 275 mm. (Pl. 115, 11)
- 16) Rim sherd of a graphited vessel. The sherd is broken at the bottom of the conical neck, where there is a line of impressed decoration (Pl. 115, 21). This sherd may come from the handled vessel containing the cremation, which is now lost. (Píř 1907a, 471, fig. 1)
- 17) Bone disc, ca. 56 mm in diameter, with engraved circles and 'spiral' decoration. Lost. (Píř 1907a, 471, fig. 2)

Museum: Národní Muzeum, Prague (inv. no. 111. 675-713).

153 Lhotka

(okr. Ústí n. L., Bohemia)

References: Kern 1934, 77-84; Paret 1935a, 28; Dvořák 1938b, 64-66; Koutecký 1968, 418.

Description: This grave was found in the 'Schwarzenberg' brickworks in 1919. A rectangular pit was uncovered, apparently measuring over 2 m in depth and orientated W-E. To the E were remains of two horses, and above them was the inhumation. The wagon parts were found to the W. The finds included an iron sword, an iron spearhead, iron tyres, ribbed conical nave fittings, some strips of bronze sheet, rich horse-gear, and a large amber bead.

Finds:

- 1) Conical iron nave-neck fittings, each with three ribs. The nave fittings had a maximum diameter of 180 mm, a minimum diameter of 140 mm, and were 48 mm high. Lost. (Pl. 117, 5)
- 2) 22 fragmentary bronze sheet bands, ca. 37 mm wide, curved in profile; they seem to have been fitted to a cylindrical object ca. 120-140 mm in diameter, possibly the nave-neck. Some fragments have bronze rivets, others have iron rivets. (Pl. 118, 1-5)
- 3) Five fragments of iron bands, possibly from nave-head rings, 15-16 mm wide, originally circular in shape with an external diameter of ca. 140 mm. (Pl. 117, 8)
- 4) 28 fragments of iron tyres, said by Kern to have had a diameter of ca. 880 mm. The tyres are 23 mm wide and, when well-preserved, show a beaded profile of type Ia (Pl. 117, 2). The tyres have long-headed nails of type A, hammered in close together. The longest nail preserved had

a penetration of 68 mm; some of the nails had diagonal wood grain. (Pl. 117, 1–2.6)

- 5) Fragmentary 'U'-shaped felloe-clamp with diagonal wood grain. (Pl. 117, 3)
- 6) Five fragments of 'T'-shaped felloe-clamps. Three of the fragments show the characteristic wood grain of a Großebstadt felloe construction. On one clamp (Pl. 117, 10), it is possible to measure the angle formed by the wood grain of adjacent outer felloe plank segments. The angle measures 115°, indicating an estimated 5.5 plank segments for the outer felloe. (Pl. 117, 4.7.9.10)
- 7) Fragment of iron sheet, one end of which is rusted onto another fragment. The iron sheet was slightly curved in transverse section, but straight in longitudinal section. (Pl. 117, 11)
- 8) Iron sword in three fragments. The blade has a lozenge-shaped cross-section and badly preserved ricasso notches. Most of the tang is preserved, having a simple heavy rectangular cross-section with a single central rivet. The shoulders of the hilt each have an iron rivet. Today, 830 mm of the sword is preserved, but it was probably originally longer, because a piece of the blade seems to be missing before the point. (Pl. 116B, 1)
- 9) Socketed iron spearhead, length 195 mm. (Pl. 116B, 8)
- 10) Two fragmentary iron horse bits with twisted shafts and large rings. One end-ring preserves remains of an iron 'omega-clip' which has wood grain on its shank (Pl. 118, 6). (Pl. 118, 6.10)
- 11) One bronze bit with twisted shanks. Each end of the bit holds a large iron ring. One end of the bit has a bronze rein-hook. (Pl. 118, 8)
- 12) Six bronze rein-knobs with a tall central spike and four-spoked openwork design. The rein-knobs have a loop on the rear side. (Pl. 118, 12–13)
- 13) Two bronze ring-footed rein-knobs. (Pl. 118, 16–17)
- 14) One bronze hemispherical rein-knob. (Pl. 118, 15)
- 15) Two cast bronze toggles. (Pl. 118, 7.11)
- 16) Five bronze sheet decorative knobs. (Pl. 116B, 21–25)
- 17) Numerous bronze and iron rings. These are of various types:
 - (i) 12 fragmentary small bronze rings with rectangular or oval cross-sections. (Pl. 116B, 9–12.15–17.19–20)
 - (ii) six bronze rings with round cross-section. Thickness 4–5 mm, diameter 33–42 mm.
 - (iii) three iron rings with square cross-section. (Pls 116B, 7; 118, 9.14)
- 18) Seven bronze 'Jochschnallen' with circular openwork decoration. (Pl. 116B, 26)
- 19) Two oval bronze plaques, probably from the ends of a wooden yoke. Each of the fittings has a central bronze nail with a hemispherical head. (Pl. 116B, 13–14)
- 20) Four fragments of curved bronze yoke-bands. The ends of the band were held by two bronze nails, one of which survives. The sides of the band each had a longitudinal rib. (Pl. 116B, 18)
- 21) One amber ring with hexagonal cross-section. Internal diameter 12 mm, external diameter 31 mm. (Pl. 118, 18)
- 22) Five round amber beads with a flattened oval cross-section. (Pl. 116B, 2–6)
- 23) 24 small fragments of bronze sheet.
- 24) One '35 mm long, apparently silver, belt fitting'. Lost.
- 25) Squat undecorated conical-necked vessel, brick-red inside and outside. Height 228 mm, rim diameter 224 mm. (Pl. 119A)
- 26) Large squat conical-necked vessel, brick-red inside and

outside. On the neck are remains of black painted decoration, consisting of a standing chevron. On the shoulder is further black painted decoration, consisting of hatched triangles. (Pl. 118, 19)

Museum: Okresní Muzeum, Litoměřice (objects found by author: inv. nos 666–670, 893–898, 900–910, 912–916, 918–920 and 922–936).

154 Manětín-Hrádek, grave 196

(okr. Plzeň-sever, Bohemia)

References: Soudská 1976, 625–634.

Description: This was the only wagon-grave in the cemetery of Manětín-Hrádek, which contains burials of both Hallstatt and early La Tène date. The grave was badly damaged by ploughing, but the excavators were able to uncover a rectangular grave pit 330–370 mm deep, measuring 3.1 × 3.5 m, orientated N-S. The pit was covered with stones. Surrounding the grave was a rectangular ditch measuring 5.6 × 6.1 m. The grave may originally have been covered by a tumulus, but no traces of this survives today. In the N part of the grave pit were two oval depressions 520–620 mm deep and measuring 600 × 400 mm at the top (Fig. 212).

In the middle of the grave pit (Fig. 212, 1) was a pile of cremated bones, mixed with the sherds of three pottery vessels: a bottle-shaped vessel and two bowls (Soudská 1976, 628, fig. 3, 10–12). Close by (Fig. 212, 10) were fragments of bronze and iron fibulae, and remains of a bronze (?) pin (ibid. 629, fig. 4, 1.11–12.15). An amber disc with gold cover was probably also originally from this area, but its original position is not known, because it was only found on sieving (ibid. 629, fig. 4, 13). To the W of the cremation (Fig. 212, 4–5) were two iron rings (ibid. 628, fig. 3, 1–2). To the N (Fig. 212, 3) was found the rim of an iron phalera. A further five phalerae were found *in situ* (Fig. 212, 11) further to the W (ibid. 628, fig. 3, 3–5.7–9). In the W wheel slot (Fig. 212, 2), 520 mm deep, was a fragmentary iron rod (ibid. 629, fig. 4, 22). On the base of the wheel slot (Fig. 212, 6) were various iron nails and iron rod fragments (ibid. 629, fig. 4, 2.5–6.9–10.20–21.26). In the E wheel slot (Fig. 212, 9), at a depth of 300 mm, was an iron object with fragments of bronze sheet rusted onto it (ibid. 628, fig. 3, 6). A cluster of atypical sherds were also found, at a depth of 200 mm (Fig. 212, 8). On the base of the E slot (Fig. 212, 7) were some iron nails and other small iron fragments (ibid. 629, fig. 4, 3–4.7–8.16–19.23–25).

Museum: Archeologické sbírky Západočeské Muzeum, Plzeň.

155 Miškovice

(okr. Kolín, Bohemia)

References: Anon. 1905, 324; Dvořák 1938b, 89. Unpublished manuscript, undated, in the Archeologický Ústav, Prague (AÚ č.j. 1171/49).

Description: This grave was found at the end of the 19th century. J. Vaněk was able to save some of the finds and he gave them to the Národní Muzeum, Prague. Apart from the metal finds listed below, the museum is also supposed to have 18 sherds from this grave; these could not be found by the author.

Finds:

- 1) Remains of iron linchpins, including the shank with a perforation at the lower end (Pl. 119B, 4), and triangular pendants (Pl. 119B, 3.5–6). (Pl. 119B, 1–6)
- 2) Two iron horse bits. The shanks bear false twisting. One of

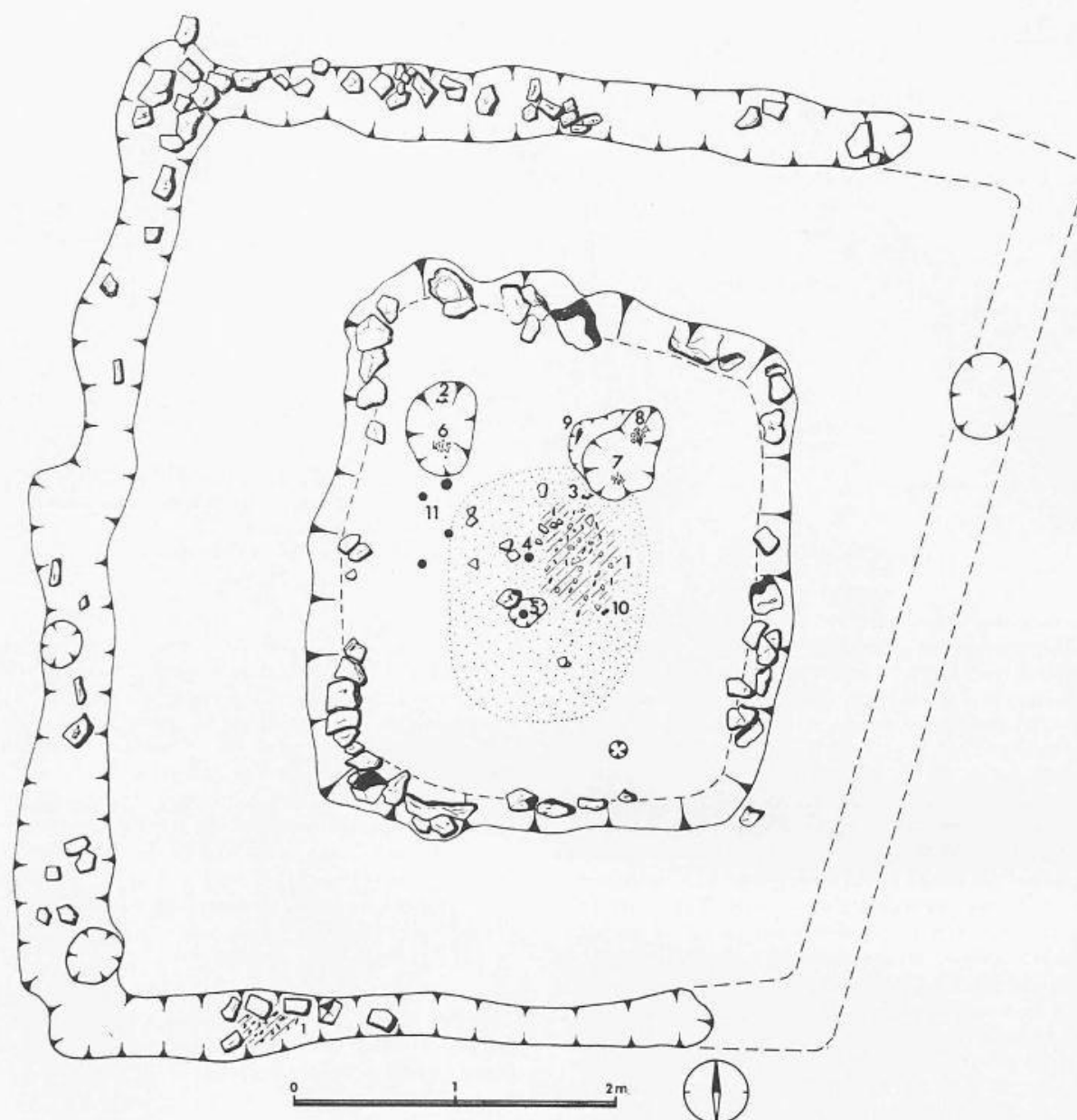


Fig. 212 Manětín-Hrádek, grave 196: plan of the wagon-grave (after Soudská 1976).

- the bits (Pl. 119B, 7) has remains of an iron 'omega-clip' with remnants of wood grain on its shank. (Pl. 119B, 7–8)
- 3) Six bronze ring-footed rein-knobs with a central boss and narrow flange. One of the rein-knobs has a small iron ring rusted to it, which is held to the knob by remains of a leather rein. (Pl. 119B, 12.14)
- 4) 29 small hemispherical rein-knobs with a strap on the rear side. (Pl. 119B, 11.13)
- 5) Two profiled iron rings, ca. 40 mm in diameter. (Pl. 119B, 9)
- 6) Two iron rings with square cross-section, ca. 33 mm in diameter. (Pl. 119B, 18)
- 7) Two iron rings, ?originally with square cross-section, 40 mm in diameter. (Pl. 119B, 10)
- 8) Six iron rings with square cross-section, ca. 33 mm in diameter. (Pl. 119B, 16)
- 9) Six iron rings with square cross-section, ca. 30 mm in diameter. (Pl. 119B, 17)

- 10) Two iron rings with rectangular cross-section, ca. 35 mm in diameter. (Pl. 119B, 15)

Museum: Národní Muzeum, Prague (inv. no. 66. 925–991; originally also 18 pottery sherds, inv. nos 2101–2118, lost ?).

156A Nehvizdky, grave 1 (okr. Praha-východ, Bohemia)

References: Koutecký and Špaček 1982, 60–69.

Description: Two wagon-graves were found in 1977 in the course of road-building. They form part of a Bylany cemetery of unknown size.

Grave 1 comprised a rectangular pit (5.64 × 2.7 m, and 1.2–1.3 m below the present-day ground surface), orientated N–S, disturbed by a trench 1.7 m wide which passed through its middle part (Fig. 213). In each corner of the pit was a post-hole,

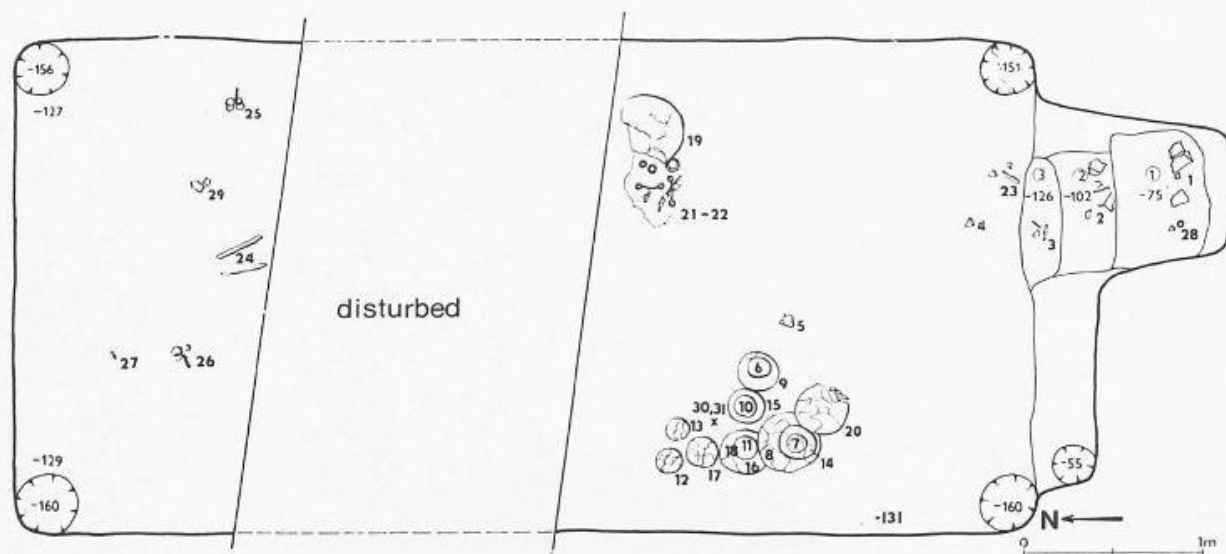


Fig. 213 Nehvizdky, grave 1: plan of the grave pit (after Koutecký and Špaček 1982).

and Koutecký suspects that there was originally another pair of post-holes in the middle of each of the long sides.

The narrow S side of the pit had three steps cut into the wall, presumably for ease of access to the chamber. On the steps were a number of finds: pottery sherds (nos 1, 2, 4), bones of domesticated cattle (nos 3, 23), and a profiled bronze ring, 24 mm in diameter (no. 28). In the SW part of the grave was a group of 20 pottery vessels (nos 5–18, 20) and two iron pins (surviving lengths 55 and 70 mm), one of which with a 'swan's neck' (nos 30, 31). In the SE part of the grave was also a large pottery vessel (no. 19) and a collection of bronze and iron horse-gear. The bronze horse-gear consists of 28 small bronze rein-knobs and 12 larger ring-footed rein-knobs (no. 22; Fig. 102, 1–2). The iron horse-gear comprised three iron horsebits (no. 21: 1–3, 26, 8; apparently a pair of simple jointed bits, possibly with iron rings in their end-loops, and a bit with an iron rein-hook hanging from one of its end-loops), 12 fragments from three or four iron cheek-pieces (no. 21: 5, 8–11, 22–28) and numerous iron rings (no. 21: 4, 7, 12–21, 29–31). A reconstruction of a cheek-piece has been attempted on Fig. 104.

The central part of the grave was destroyed but the N part was still intact. In the middle of the N part were some human tibia bones (no. 24), showing that the inhumation burial was originally orientated (head)S–N(feet). To each side of the bones was an iron linchpin of Bohemian type (nos 25, 26; lengths 135 and 145 mm). The N part of the grave also contained an iron rod, possibly part of a pin (no. 27), and two pottery sherds (no. 29).

Comments: The numbers given above refer to Koutecký and Špaček's plan (here Fig. 213) and text figures (Koutecký and Špaček 1982, 64–69, figs 8–12). As Koutecký and Špaček suggested, the grave floor probably originally had four linchpins, two of which would have been removed by the road-builders' trench.

156B Nehvizdky, grave 2 (okr. Praha-východ, Bohemia)

References: Koutecký and Špaček 1982, 60–69.

Description: Grave 2 comprised an irregular rectangular pit

(4.7–4.9 × 2.4 m, and 1.08–1.2 m below the present-day ground surface), orientated NNW–SSE. This grave had also been disturbed by a 1.7 m wide trench, which cut through the middle of the grave (Fig. 214). In the N part of the grave were the lower leg bones of the inhumation (no. 5), and two bronze ankle-rings (nos 3, 4), showing that the inhumation was orientated (head)SSW–NNE(feet). A few more human bones, including teeth, were found further towards the centre (no. 6). Near the S edge of the N part of the grave were remains of six pottery vessels (nos 7–8, 13, 16). At the N end of the grave were two iron linchpins of Bohemian type (nos 1–2; lengths 120 and 130 mm), by the NE of which was an area of soil discolouration (no. 18). In the S part of the grave were six pottery vessels (nos 9–12, 14–15) and some bones of domesticated cattle (no. 17).

Comments: The numbers given above refer to the grave plan (Fig. 214) and Koutecký and Špaček's illustrations (1982, 70, fig. 13; 71, fig. 14). As in the case of grave 1, a second pair of linchpins may have been removed by the road-builders' trench.

157 Nymburk-Habeš (okr. Nymburk, Bohemia)

References: Filip 1932, 60–61; Dvořák 1938b, 66.

Description: This grave was found during building work, but the exact date of the discovery is not known. According to the museum catalogue, the metal finds were uncovered in the vicinity of human bones and some pottery sherds.

Finds:

- 1) Two tyre fragments of type VC and 29 tyre nails, some with small fragments of iron tyres. The tyres are 25 mm wide and have closely-spaced nails with large rectangular heads (ca. 16–17 × 30–38 mm). The longest surviving nail penetration is 49 mm. A few of the nail shafts preserve wood grain, which is always horizontal in direction. Filip, writing when the tyres were well-preserved, estimated the diameter of the tyres at 800 mm. (Pl. 120, 9)
- 2) Remains of bronze sheet nave coverings of type Erkenbrechtsweiler. The conical nave-neck was covered with bronze sheet, decorated with two groups of ribs. The seam

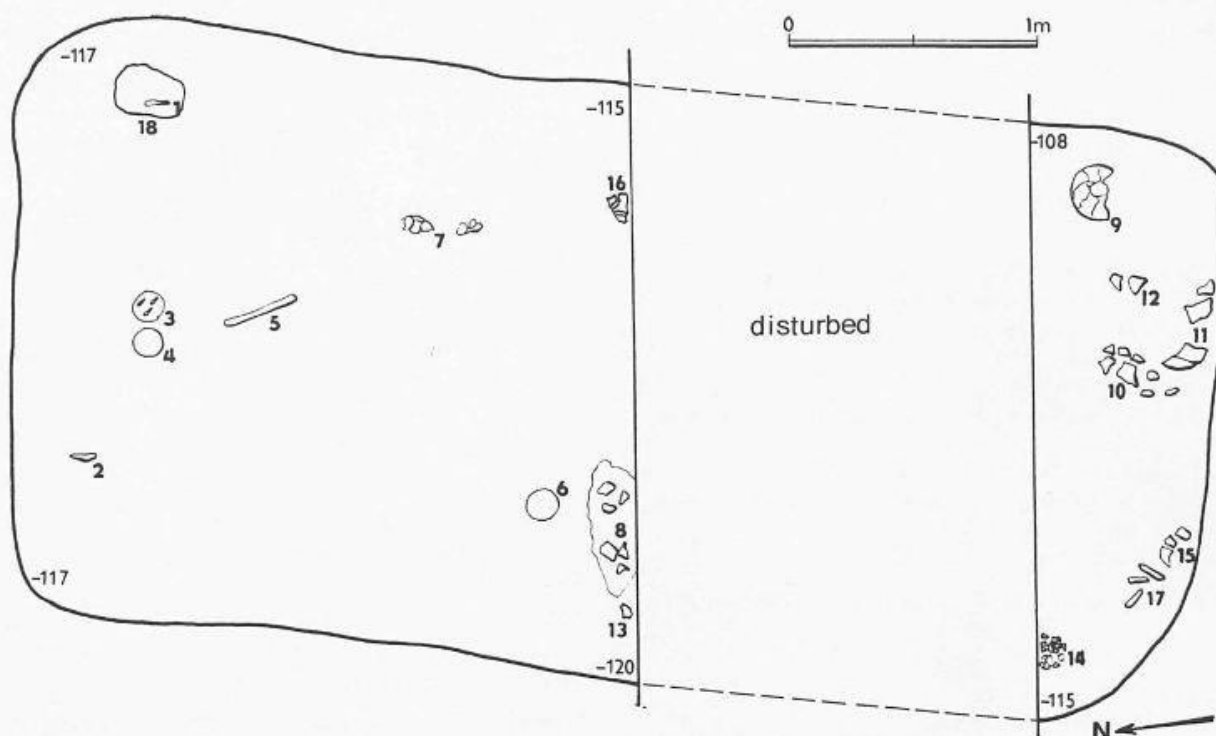


Fig. 214 Nehvizdky, grave 2: plan of the grave pit (after Koutecký and Špaček 1982).

of the nave-neck sheath was covered by a ribbed bronze sheet band and held by a row of spherical-headed bronze nails. There follows a ribbed bronze nave-head ring which joins the nave-neck sheathing to the iron nave-cap. (Pl. 120, 1.5.8)

- 3) Two iron linchpins with pendent iron rings. (Pl. 120, 3–4)
- 4) Iron horse bit with small end-loops. The shanks of the bit are square in cross-section. Each end of the bit has a double-looped iron fitting and an iron ring. (Pl. 120, 6–7)
- 5) One bronze rein-knob with central spike, broad flange, and a loop on the rear side. (Pl. 120, 2)

Museum: Vlastivědné Muzeum, Nymburk.

158 No grave allocated.

159 Ohrada u Kolína

(okr. Kolín, Bohemia)

References: Dvořák 1936, 77; Dvořák 1938b, 89; Koutecký 1968, 421.

Description: This grave was excavated by F. Dvořák in 1927. It measured 4.26 × 3.2 m, with a depth of 1.58 m. The grave contained an extended inhumation orientated (head)S-N(feet), 20 pottery vessels, an iron linchpin with 'ring-shaped decoration' and, in the SW corner, a wooden yoke.

The yoke was 1.12 m long, and was provided with bronze and iron yoke-bands decorated with point-bosses. The yoke also had an iron 'chain-pendant', of which there only survives the central ring with little loops on the rim.

Comments: It is not possible to distinguish the pottery from this grave among the vessels in the Kolín museum.

Finds:

- 1) Fragmentary iron linchpin of Bohemian type. (Pl. 119C, 1)
- 2) Seven fragments of iron sheet with point-boss decoration. On one fragment, two pieces of iron sheet are joined by a bronze nail. (Pl. 119C, 3.6.8)
- 3) Numerous iron rings, always with square cross-section. Frequently two iron rings are rusted together, along with a bronze rein-sleeve (Pl. 119C, 9–11). In one case, two iron rings are rusted together, and a small bronze nail is fused to the surface (Pl. 119C, 4). (Pl. 119C, 2.4.7.9–11)
- 4) Fragment of an iron boss, onto which is rusted an iron ring with square cross-section. (Pl. 119C, 5)
- 5) Iron toggle, with a fragment of leather rein preserved in the rein-opening. (Pl. 119C, 12)
- 6) 20 pottery vessels.

Museum: Regionální Muzeum, Kolín (inv. no. 11. 774–801).

160 Opařany, tumulus 2

(okr. Tábor, Bohemia)

References: Píč 1900, 59.155; Dubský 1949, 188.

Description: This tumulus contained remains of iron tyres (lost), decorated bronze phalerae (Píč 1900, pl. 32, 4.9.11), some bronze nails with large flat heads (some still with traces of leather adhering to the shanks, *ibid.* pl. 32, 12.14.21), iron rings (*ibid.* pl. 32, 16–17.22), some iron nails (*ibid.* pl. 32, 13) and some bent and looped iron rods (*ibid.* pl. 32, 18.20.23).

Museum: Národní Muzeum, Prague (inv. no. 110. 122–187 and 204–227).

161 Pašovice

(okr. České Budějovice, Bohemia)

References: Beneš 1966, 6–7.

Description: One of the tumuli in this tumulus cemetery was excavated by J. Burian. The tumulus contained iron remains of a four-wheeled wagon, an iron sword, two iron spearheads, an iron knob and five fragmentary iron rings.

Finds:

- 1) Iron tyres, 702 mm in diameter. (Lost)
- 2) Four iron linchpins of Bohemian type, two of which are lost. The surviving linchpins measure 108 and 115 mm in length. (Beneš 1966, pl. 6, 3–4)
- 3) Iron sword, length 615 mm. (ibid. pl. 17, 5)
- 4) Two iron spearheads, lengths 230 and 239 mm. (ibid. pl. 6, 1–2)
- 5) Iron (?)rein-knob, diameter 25 mm. (ibid. pl. 6, 5)
- 6) Five iron ring fragments, diameters 46, 48 and 68 mm. (ibid. pl. 6, 6–10)
- 7) Seven iron fragments.

Museum: Muzeum Keramiky, Bechyně (inv. nos 4682–4695).

162 Plaňany

(okr. Kolín, Bohemia)

References: Dvořák 1933, 35–37; Dvořák 1936, 75–76; Dvořák 1938b, 88–89; Koutecký 1968, 421.

Description: Dvořák excavated eight Bylany graves at Plaňany, the richest of which was grave 5, which did not contain wagon fittings (Fig. 137). Sadly, the other seven graves were not published by Dvořák. The six iron linchpins from Plaňany in Kolín museum must have come from graves 1–4 or 6–8.

Wagon finds:

- 1) Six fragmentary iron linchpins of Bohemian type. (Pl. 121)

Museum: Regionální Muzeum, Kolín (inv. nos 10. 680, 684 and 686; 11. 826, 852 and 853).

163 Poláky, grave 21

(okr. Chomutov, Bohemia)

References: Unpublished excavation report, undated, in the Most expedition of the Archeologický Ústav, ČSAV.

Description: This grave consisted of a rectangular pit measuring 2.6 × 5.3 m, orientated E-W, with a depth of 700–800 mm. Remains of a stone covering were found in the W part of the pit; at the E side, it had been totally destroyed. The N and S sides of the pit were sloping, while the W and E sides were almost vertical. In the middle of the grave was a post-hole 300 mm deep. In the W side were remains of timbers running in a N-S direction. The cremation was found in two piles by the W side. The position of the finds was very disturbed.

Comments: The publication of the Poláky cemetery is being prepared by D. Koutecký.

Finds:

- 1) 37 fragments of iron tyres and tyre nails. The tyres have a type II cross-section and a width of 25–29 mm. The nails are spaced 85–115 mm apart and have large sub-rectangular heads (ca. 30–48 × 15–20 mm). One nail is preserved to its full length, including the tip which was bent over; this nail had a penetration of 65 mm. (Pl. 122A, 1.7)

- 2) Curved fragment of iron sheet, possibly from the nave.
- 3) Numerous fragments of iron sheet, one fragment possibly from a felloe-clamp.
- 4) Fragments of at least eight bronze sheet bosses, each with a central perforation and iron nail. One of the nails (Pl. 122A, 6) is fully preserved, length 53 mm, and has traces of horizontal wood grain. (Pl. 122A, 2–6)
- 5) 24 bronze nails with large flat heads.
- 6) 17 bronze flanged bosses (?rein-knobs), each with remains of two iron rivets. Diameter 22 mm. (Pl. 122A, 8–11)
- 7) Three iron rings with square cross-sections, diameters 32, 50, 52 mm.
- 8) Fragmentary iron rings or iron nails.
- 9) Five iron fragments.
- 10) 10 pottery vessels.

Present location: Archeologický Ústav, ČSAV, expositura Most.

164 Praha-Bubeneč, 'U modré růže', grave 3 of 1907

(Prague, Bohemia)

References: Dvořák 1938b, 66; Koutecký 1968, 422. Unpublished daybook of J. A. Jíra, dated 11th–13th May 1907, in the Hanspaulka Museum, Prague.

Description: This grave was excavated by J. A. Jíra in 1907, near the tavern 'U modré růže'. In his archaeological daybook, Jíra listed the finds from 'cremation grave 3': iron fittings from four wheels, fragments of burnt bone, fragments of bronze, two iron horse bits and a bronze arm-ring. The surviving iron wheel fittings show that the vehicle must have had four wheels.

Comments: Drawings from the inventory book of the Hanspaulka Museum have been used here to illustrate objects which are lost.

Finds:

- 1) Numerous fragments of iron tyres and iron tyre nails. The tyres have a type VII cross-section and are about 35 mm wide. The tyres were provided with rectangular nail-holes (4 × 6 mm) spaced every 220–270 mm, and countersunk nails with small subrectangular heads. One nail is fully preserved and must have had a penetration of ca. 46 mm. (Pl. 122B, 1.6)
- 2) Remains of iron nave fittings, consisting of:
 - (i) simple iron nave-caps ca. 125 mm in diameter, with an axle-channel ca. 57 mm in diameter. One fragment (Pl. 123, 4) also has iron sheet from the cylindrical nave-head. (Pl. 123, 1–4)
 - (ii) large iron nave-stock ring with an external diameter of ca. 165 mm and an internal diameter of ca. 105 mm. Note that the internal diameter of the nave-stock ring is less than the external diameter of the nave-caps, showing that the nave must have had a nave-neck with a smaller diameter than the nave-head. (Pl. 123, 5)
- 3) Four iron linchpins with flat semi-lunate heads. (Pl. 122B, 2)
- 4) Iron fitting from the (?) wagon-box, length 140 mm, width ca. 28 mm. This fitting was 'U'-shaped in cross-section and had three nail holes. Two nails survive, with spherical heads and a maximum length of 58 mm. (Pl. 124A, 1)
- 5) One fragmentary felloe-clamp, internal height ca. 46 mm. (Pl. 122B, 4)
- 6) Two iron discs 58–59 mm in diameter. One of the discs has an iron 'stump' positioned slightly off-centre. (Pl. 122B, 3.5)

- 7) At least 23 fragments of iron sheet, probably from the wagon.
- 8) One iron horse bit with small end-loops, in each of which is suspended an iron rein-hook. A rein-hook also survives from the second horse bit. (Pl. 124A, 7)
- 9) Seven iron rings, ca. 55 mm in diameter, each with a looped iron rod with thickened end. Lost. (Pl. 124A, 8–13)
- 10) Three iron rings, diameters 43, 45 and 59 mm.
- 11) Two iron clamps. Lost. (Pl. 124A, 5–6)
- 12) Three triangular iron sheet pendants, each with a looped end. Lost. (Pl. 124A, 2–4)
- 13) Bronze barrel-shaped arm-band with engraved and ribbed decoration. All the decoration is engraved except for the triple vertical lines, which are raised ribs. The arm-band was made of bronze sheet; the cross-section could not be drawn because the fragmentary arm-band is restored on a plaster core. (Pl. 123, 6)

Museum: Muzeum hlavního města Prahy (Hanspaulka), Prague (inv. nos 393–457 and P. 4095).

165 Rvenice, grave 1 of 1963

(okr. Louny, Bohemia)

References: Koutecký 1966a; *ibid.* 1968, 425–6; Pleinerová 1973, 274–276. Unpublished manuscript by D. Koutecký, dated 1978, in the Most expedition of the Archeologický Ústav ČSAV (report of the excavation in 1963 of Rvenice grave 1).

Description: Two rich graves were found in a gravel-pit in Rvenice, one of which had wagon remains. The second grave is

also remarkable, containing a bronze situla, horse-gear, and numerous pottery vessels (grave 2 of 1966: Pleinerová 1973).

The wagon-grave was surrounded by a circular ditch (800–900 mm wide and 20 m in diameter), showing that the grave was originally covered by a tumulus. The NE quarter of the grave had been destroyed by gravel excavation. 400 mm below the surface, the rectangular grave pit was found, measuring 4 × 5.4 m, with the long sides orientated E-W. At a depth of 300–500 mm below the surface, a continuous layer of transverse oak beams was uncovered, representing the roof of the chamber. In the W end of the chamber, the roof was covered by a layer of stones. No traces of wooden chamber walls were found, but wooden remains of the floor were detected at a depth of 1.2 m. The grave was excavated in four quadrants (I: NW; II: SW; III: NE; IV: SE; see Fig. 215).

In quadrant I, traces of wood survived in three places (hatched on Fig. 215). Roughly in the middle of the quadrant lay an extended inhumation orientated (head)E-W(feet). At the level of the head, to the left of the body, was an iron spearhead with its point to the E. Not far from the inhumation were two piles of cremated bone; it is not known if this was animal or human bone. At the NW, SW and SE corners of the quadrant were iron linchpins. The NE linchpin had been lost to the gravel quarrying.

In quadrant II was the second inhumation, likewise orientated (head)E-W(feet). Again, a spearhead was found to the left of the body at the level of the head. Close to the head were two pottery vessels. Linchpins were found at the four corners of quadrant II. At the NW corner were two linchpins, one of which must have belonged to the 'wagon' of quadrant I; at the NE corner, only one linchpin was found, although two

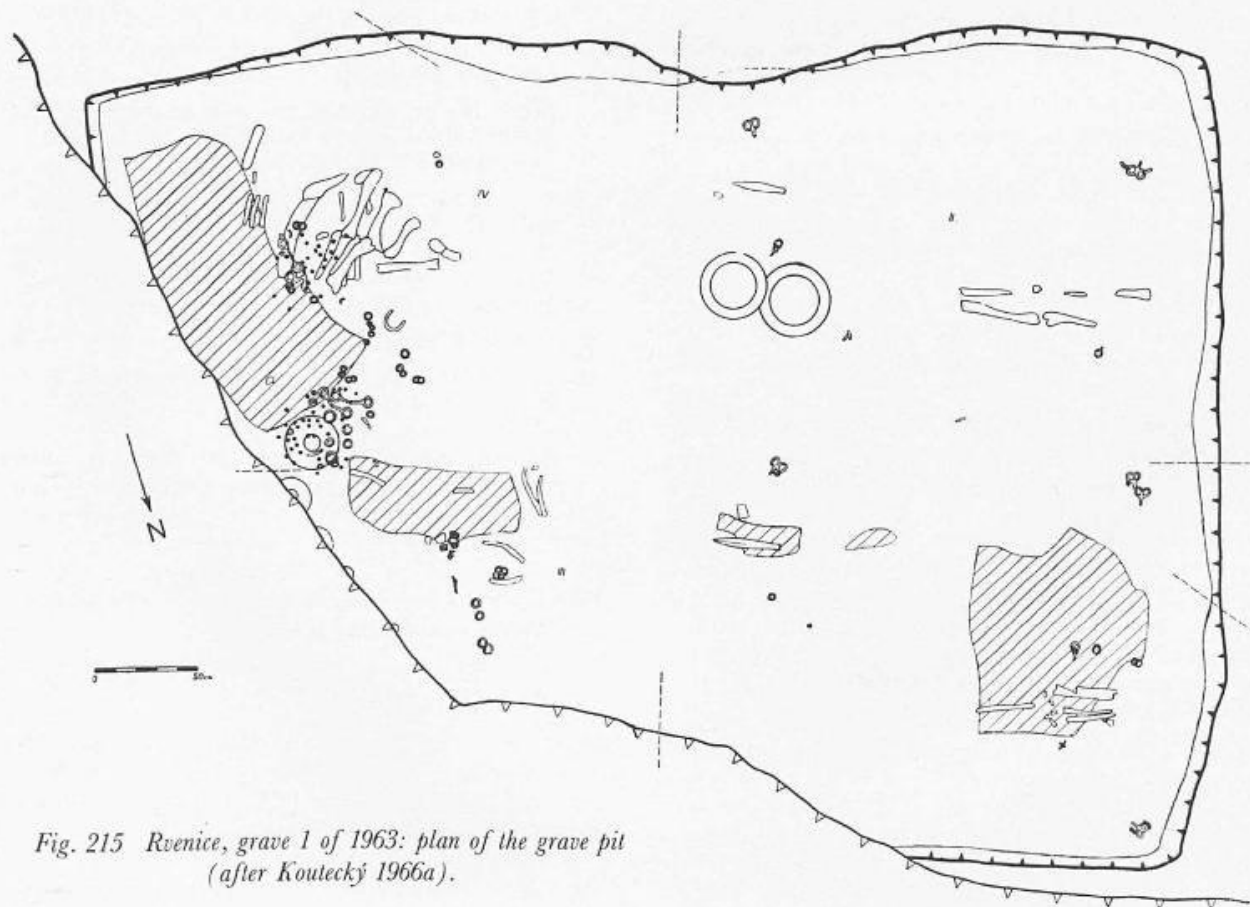


Fig. 215 Rvenice, grave 1 of 1963: plan of the grave pit (after Koutecký 1966a).

would be expected if each inhumation were provided with a full set of four linchpins. It is conceivable that the second linchpin was lost to corrosion, or was missed by the excavators.

At least half of quadrant III had been destroyed by quarrying activity. At the edge of the destroyed part were remains of four pottery vessels and sherds of further vessels. The quadrant also contained animal bones and a large quantity of bronze buttons and iron rings. At the E end of quadrant IV was a large area of wood. The quadrant also contained the bones of an aurochs, which seems to have been associated with two iron (?horse) bits. In the NE part of the quadrant was a pottery bowl, and close by were two iron horse bits and a large quantity of iron rings and bronze rein-knobs. Three further horse bits came from the disturbed NE part of the grave.

Some of the wood from the grave chamber was analysed by the VÚHU laboratory, Most, and gave a ^{14}C determination of 2655 ± 50 b.p., or according to D. Koutecký, 682–732 b.c.

Comments: This grave seems to have housed two burials, each provided with a set of linchpins, a spear, horse-gear and pottery vessels. It remains unclear, however, whether real wagons were put into the grave. If so, they must have been entirely of wood with, apart from the linchpins, no metal fittings. In this case, the location of the linchpins would show the position of the axles, indicating a wheel base of ca. 1.82 m and a wheel gauge of ca. 1.57 m. On the other hand, the linchpins could have been deposited as *pars pro toto* of the full-size wagons.

Finds:

- 1) Seven iron linchpins of Bohemian type. The linchpins bear pendent iron rings. Five triangular iron looped pendants, ca. 65 mm long, were also found, which may originally have come from linchpins.
- 2) Seven iron horse bits of various types. Some fragments have twisted shanks and end-loops with a notched profile. Another fragment is characterised by long shanks and small end-loops. All of the mouth-pieces had iron rings looped through their end-loops, and several fragments show that some of the bits had iron 'omega-clips' hanging in their end-loops.
- 3) 82 bronze rein-knobs, diameter 13–33 mm. These are of three types:
 - (i) eight hemispherical knobs with a single loop on the rear side.
 - (ii) 65 with a central boss, narrow flange and single loop on the rear side.
 - (iii) nine ring-footed knobs with central boss and narrow horizontal flange.
- 4) 20 iron ring-footed knobs with central boss and narrow flange, diameters 17–35 mm.
- 5) Nine bronze rein-sleeves, each with two perforations and a single rivet.
- 6) 76 iron rings or ring fragments, diameters 25–54 mm. Partly from the horse-gear and partly from the linchpins.
- 7) Three small bronze rings, diameters 15–27 mm.
- 8) Two iron toggles, each with an opening in the middle, lengths originally ca. 60–65 mm.
- 9) Two iron spearheads, lengths 202 and 404 mm.
- 10) Remains of at least 12 pottery vessels.

Present location: Archeologický Ústav ČSAV, expositura Most.

166 Skalice

(okr. Tábor, Bohemia)

References: Richlý 1903, 79; Richlý 1905, 81–82; Píč 1909, 346;

Švehla 1923, 24–27; Filip 1956, 266–267; Šaldová 1957, 686; Chytráček 1983, 427.447; Krajč 1984; Krajč (forthcoming).

Description: This was the largest in a group of three tumuli and was excavated by J. Švehla in 1901–2. Švehla found that the tumulus contained a stone core, and he reported that the tumulus measured 17×23 m, with a height of 1.2 m. There were two cremation graves in the tumulus, the central grave containing rich goods, including wagon remains. The goods of the central grave included a bronze ribbed bucket, a large bronze dish, 64 bronze bossed rein-knobs, one large bronze rein-knob, 25 square openwork rein ornaments, eight decorated bronze buttons, a bronze phalera 'from a shield', an arm-ring of thick bronze sheet and numerous rusted iron objects including iron tyres, an iron socketed axe, the blade of an iron sword, four horse bits, and four iron 'terminals'.

Finds:

- 1) Fragmentary iron nave-cap (?). The axle-channel is ca. 62 mm in diameter, and the external diameter is at least 126 mm. The internal edge of the nave-cap is thickened. The outer surface of the nave-cap seems to bear part of the shank of a linchpin. (Pl. 124B, 1)
- 2) Rusted iron objects including iron tyres. Lost.
- 3) Nine fragments of an iron sword blade, length 750 mm. (Krajč 1984, pl. 28, 861)
- 4) 21 fragmentary square openwork bronze rein ornaments, measuring 35×35 mm. (Pl. 124B, 6)
- 5) Eight bronze looped rein-knobs, 23 mm in diameter, with a flange, and a central boss terminating in a spherical button. (Pl. 124B, 4–5)
- 6) 19 bronze rein-knobs of various different types. Most of them are flat with a small central button, and punched decoration on the upper surface. Some of the buttons have a raised ring on the upper surface. (Pl. 124B, 2–3.8)
- 7) Three iron horse bits with large terminal rings. The rods of the horse bits are very short and thickened in the middle. (Pl. 124B, 7)
- 8) Bronze ribbed bucket. (Krajč 1984, pl. 6, 668)
- 9) Bronze dish of 'Hatten' type. (Chytráček 1983, 429, fig. 1, 1)
- 10) Arm-ring of thick bronze sheet. Lost.
- 11) Iron axe with rectangular socket. Lost.
- 12) Four iron 'terminals'. Lost.
- 13) 10 fragments of bone.
- 14) Two pottery vessels. (Krajč 1984, pls 7, 679; 8, 687)

Museum: Muzeum Husitského Revolučního Hnutí, Tábor (inv. nos 50–53, 89–134 and 666–671).

167 No grave allocated

168A-B Straškov – Račiněves, tumuli of 1911 and 1913

(okr. Litoměřice, Bohemia)

References: Stocký 1930, 47–53; Dvořák 1938b, 66–68; Koutecký 1968, 426.

Description: The cemetery of Straškov was the subject of excavations by J. L. Píč in 1911, A. Stocký and K. Buchtela in 1913, and J. Böhm in 1933. In each of these campaigns, three graves were excavated; those excavated by Böhm had already been excavated in 1911 or 1913. It is curious that the two wagon-graves uncovered in 1911 and 1913 were apparently almost identical.

In Pič's excavation, two large storage vessels were found at the W end of the grave (Dvořák 1938b, 19, fig. 16, 9–10), on which lay a wooden yoke 1.3 m long, decorated with numerous bronze squares arranged in chequerboard fashion, and bronze yoke-bands with point boss decoration (ibid. 17, fig. 14; 18, fig. 15; 20, fig. 17, 1). About 1.5 m E of the yoke was a pile of sherds (ibid. fig. 16, 1–8), 250 mm to either side of which were iron nave fittings and iron tyres (the tyres were discarded by the excavators).

In the storage vessels, under the yoke, was a quantity of horse-gear, including bronze rings (ibid. fig. 17, 24–33), large ring-footed rein-knobs with a central spike (ibid. fig. 17, 2–3.9–10.15–16), bronze hemispherical ring-footed rein-knobs (ibid. fig. 17, 17–23), and remains of two or three iron horse bits (ibid. fig. 17, 8.12–13). To the E of the yoke was an iron knife. Pič also found human bones and cremated bones in this grave.

Böhm re-excavated this grave in 1933 and reported that it measured 5.5 × 4.75 m in size, was covered by a tumulus 20 m in diameter and 300 mm high, and housed a wooden grave chamber. If Böhm's measurements are to be trusted, then it is clear that Pič only uncovered a fraction of the grave. Thus, it is unlikely that the grave contained a two-wheeled chariot (see Stocký's reconstruction, 1930, 49, fig. 3); indeed, Pič probably only found the front pair of wheels, missing the rear wheels which were presumably located further to the E.

Stocký and Buchtela opened three graves, measuring 2.1–2.6 × 1.8–2.3 m, with a depth of 1.9–2.2 m, orientated E–W. According to the excavators, the graves had been robbed. In the W part of one grave were two large vessels containing horse trappings. About 1.5 m to the E of the vessels was a pile of sherds, by which were remains of iron tyres.

Comments: The wagon finds in the Národní Muzeum, Prague, probably mainly come from Pič's excavations, although it is not impossible that some objects from the 1913 excavations could have been added to the collection. However, the felloe-clamps and tyres show that more than one wagon is represented among the finds. Thus, while all the tyre nails bear horizontal wood grain, as do the felloe-clamps with flaring, trumpet-shaped ends (Pl. 125B, 6–7.9–10) and the felloe-clamps with rectangular ends measuring ca. 37 mm in width (Pl. 125B, 8.11–12), the 'dumb-bell'-shaped clamps and the clamp fragment measuring ca. 42 mm in width bear diagonal grain (Pl. 125A, 5–10). This implies that two types of felloe construction are represented by the grave goods. Furthermore, two types of nave fittings are represented, those with undulating nave-head rings (Pl. 125A, 1–4) and those with flat nave-head rings (Pl. 125B, 1–2). One is tempted to suggest that the naves with flat nave-head rings, and the felloe-clamps with flaring ends came from the same wagon because on both types, examples seem to have been mended using bronze nails (Pl. 125B, 1.7.9). In that case, they would both belong with the surviving tyre fragments (N.B. all with horizontal wood grain), which must have come from the grave of 1913, because it was expressly mentioned that the tyres from the 1911 excavations were too badly preserved to be conserved.

The wagon fittings from the grave of 1911 have been given cat. no. 168A (Pl. 125A), whereas those of 1913 have the cat. no. 168B (Pl. 125B). Some finds cannot be assigned to an individual grave complex (Pl. 126A).

Note that the 1913 excavations also produced a bronze horse bit (Dvořák 1938b, 20, fig. 17, 14) and a pottery vessel (ibid. 20, fig. 17, 36); it is not known from which of the three graves they came.

Wagon finds:

- 1) Fragmentary iron nave fittings of type Breitenbrunn. The

number of fragments (including 34 fragments of nave-head rings), and the typological diversity, show that they came from more than two wheels, and probably from different wagons. Some fragments have a nave-head ring with an undulating cross-section, a cylindrical iron nave-neck sheathing, and a ribbed iron nave-cap ('tumulus of 1911', Pl. 125A, 1–4). Other fragments have a flat nave-head ring, ribbed nave-cap, and remnants of cylindrical nave-neck sheathings ('tumulus of 1913', Pl. 125B, 1–2). On one of these fragments, a crack in the nave-cap was repaired with two bronze nails with triangular heads (Pl. 125B, 1).

- 2) Small fragments of iron tyres, 20–22 mm wide, with a type II cross-section, and nails with slightly projecting heads. The maximum surviving nail penetration is 67 mm. The nail shanks bear horizontal wood grain. ('tumulus of 1913', Pl. 125B, 3–5)
- 3) Numerous fragments of iron felloe-clamps which have either a narrow, rectangular end, or an end which widened in a trumpet-shape. One particularly wide clamp fragment has traces of diagonal wood grain meeting at an angle of 132° ('tumulus of 1911', Pl. 125A, 7), the others, of which at least four survive, have horizontal wood grain ('tumulus of 1913', Pl. 125B, 6–12). Two clamps have bronze instead of iron nails, which could stem from a repair of the wheel ('tumulus of 1913', Pl. 125B, 7.9).
- 4) 15 'dumb-bell'-shaped iron felloe-clamps, of various sizes, frequently with remains of diagonal wood grain. On three clamps the angle at the join between the outer felloe segments can be measured: 109°, 128°, 129°. ('tumulus of 1911', Pl. 125A, 5–6.8–10)
- 5) Fragments of iron linchpins, probably of Bohemian type. The fragments include three pendent iron rings rusted onto a piece of iron sheet. (Pl. 126A, 1–2.4)
- 6) One fragment of iron sheet with 'L'-shaped cross-section, surviving to a length of 67 mm. On the rear side of the fragment is wood grain running parallel to its long axis. (Pl. 126A, 3)
- 7) Two iron fragments, probably from a yoke chain. (Pl. 126A, 6)
- 8) Fragmentary hollow iron lens-shaped object. On the top of the hollow lens-shaped object is an iron ring with angular cross-section; both the ring and the lens-shaped object are pierced by an iron nail with a hemispherical head. (Pl. 126A, 5)

Museum: Národní Muzeum, Prague (inv. no. 111. 214–530).

169 Švihov – Červené Poříčí

(okr. Klatovy, Bohemia)

References: Leger 1886, 217–224; Šaldová 1968, 322.

Description: This tumulus belonged to a group of three tumuli, and measured about 20 paces in diameter. The excavators found a stone core, underneath which was a large quantity of finds; these included a large number of iron fragments, among which were iron tyres and tyre nails (Pl. 126B, 5–7). The tyres were narrow (perhaps 15–20 mm wide), and the nails had heads up to 64 mm long. The excavators also found a fragment of bronze sheet decorated with three ribs, which may come from a nave-neck sheathing (Pl. 126B, 1). Otherwise, the excavators found a piece of gold sheet, 20 × 30 mm in size, with cross-hatched engraved decoration (Pl. 126B, 8), a bronze cauldron with cross-shaped attachments (Pl. 126B, 18), a bronze handled cup (Pl. 126B, 9), two fragments of bronze band with rivets, from a

bronze vessel (Pl. 126B, 3–4), three bronze (?) rein-knobs, ca. 50 mm in diameter (Pl. 126B, 14), a bronze ring, ca. 18 mm in diameter (Pl. 126B, 13), two bronze handles from a bronze vessel (Pl. 126B, 10), a perforated fragment of bronze sheet (Pl. 126B, 15), two curved bronze rods of unknown function (Pl. 126B, 11–12), nine twisted bronze rods, with each end flattened, and sometimes perforated and provided with a rivet (Pl. 126B, 2), and two iron (?) arrowheads (Pl. 126B, 16–17). The tumulus also contained sherds from numerous pottery vessels and 'ash', perhaps indicating that this was a cremation burial.

Comments: The museum of Klatovy has been closed for many years, and the author was not able to study these finds.

Museum: Okresní Muzeum a Galerie, Klatovy (inv. no. 492).

170 Tuchoměřice

(okr. Praha-západ, Bohemia)

References: Koutecký 1983, 244–245.

Description: Remains of a destroyed Bylany grave were rescued in 1956 by K. Motyková. The finds were apparently given to the Národní Muzeum, Prague, but are now lost. Koutecký was able to publish some drawings of the finds, made from surviving photographs.

Finds:

- 1) Part of an iron linchpin.
- 2) Bronze horse bit with twisted decoration, one end-loop of the bit has a bronze ring. (Koutecký 1983, 245, fig. 3, 1)
- 3) Two bronze rein-knobs with crossed straps on the rear side. (ibid. 245, fig. 3, 2)
- 4) Two small profiled bronze rings. (ibid. 245, fig. 3, 3)
- 5) About half of a flat iron ring. (ibid. 245, fig. 3, 4)
- 6) Some grey-brown undecorated sherds.

Museum: Národní Muzeum, Prague.

171A Vikletice, grave 17 of 1965

(okr. Chomutov, Bohemia)

References: Koutecký 1966b, 121–128; Koutecký 1968, 428. Unpublished excavation report by D. Koutecký, undated, in the Archeologický Ústav ČSAV, expositura Most. For a complete account of this grave, see now Koutecký 1988.

Description: Five Bylany graves were found during the excavation of a corded-ware cemetery in 1963–1965. The graves were spaced 40–155 m apart (see plan of cemetery, Koutecký 1968, 457, fig. 33). About half of grave 17 had been destroyed, but the excavators were able to uncover remains of a large grave pit 1.2–1.3 m deep, 3.65 m wide with a surviving length of 3.25 m, orientated E-W. Towards the SW corner was an iron linchpin lying on a large layer of wood. In the middle of the grave was an iron ring with a rod. In the S part of the grave was a layer of wood ca. 10–15 mm thick. In the E part of the grave were sherds of pottery vessels, including a storage vessel and some painted bowls. In total, the grave must originally have contained at least 10 pottery vessels.

Finds:

- 1) Remains of an iron linchpin of Bohemian type, length 117 mm. The linchpin was provided with pendent iron rings. (Pl. 127A)
- 2) Two iron rings, diameters 35 and 40 mm.
- 3) Sherds from at least 10 pottery vessels.

Present location: Archeologický Ústav ČSAV, expositura Most (inv. no. č.př. 308/65, 1–25).

171B Vikletice, grave 138 of 1963–4

(okr. Chomutov, Bohemia)

References: Koutecký 1966b, 121–128; Koutecký 1968, 427–8. Unpublished excavation report by D. Koutecký, undated, in the Archeologický Ústav ČSAV, expositura Most. For a complete account of this grave, see now Koutecký 1988.

Description: For information concerning this cemetery, see cat. no. 171A. Grave 138 had a large rectangular grave pit orientated E-W, measuring 3.85 × 5.7 m, with a depth of 800–900 mm. The N half of the grave was covered with stones. Almost all of the grave pit floor was covered with traces of wood. At the N side was a white ash layer, which was also encountered at the W side and in the middle of the E part of the grave. However, no traces of the burial could be detected.

In the W half of the grave were an iron ring, bronze rein-knobs, iron pendants and rings; towards the N side was a piece of gold sheet. None of the pottery vessels in this grave was found complete. In total, the grave must have contained at least 15 vessels.

Comments: Koutecký suggested that the grave had been robbed in antiquity.

Finds:

- 1) One fragment of iron nave fittings. The fragment consists of a piece of the nave-head ring and a piece of the nave-cap. (Pl. 127B, 2)
- 2) One fragment of an iron felloe-clamp with characteristic wood grain. The felloe-clamp was probably originally of the 'T'-shaped type. (Pl. 127B, 3)
- 3) Numerous small fragments of iron nails, some of which were bent over. Many fragments show traces of wood grain. (Pl. 127B, 6–9)
- 4) Numerous small fragments of iron sheet. (Pl. 127B, 1)
- 5) Numerous small fragments of bronze sheet, including one small fragment with two ribs. (Pl. 127B, 4)
- 6) Curved fragment of iron, with 'C'-shaped cross-section. (Pl. 127B, 5)
- 7) Numerous iron looped triangular pendants, original length 42–47 mm. The pendants seem to have been looped together in threes, onto iron rings which were in turn held by larger iron rings. Possibly remains of linchpins.
- 8) Six bronze rein-knobs with central boss and narrow flange, diameter 16 mm. Each knob has a single loop on the rear side.
- 9) Two bronze rings with square cross-section. Diameters 22 and 26 mm.
- 10) Fragment of gold sheet.
- 11) Remains of at least 15 pottery vessels.

Present location: Archeologický Ústav ČSAV, expositura Most (inv. nos 142/63 and 208/64).

172 Zbislav-Zhoř

(okr. Písek, Bohemia)

References: Jansová 1957, 456, note 56; Soudská 1984, 102. Unpublished excavation report by L. Jansová, dated 1952, in the Archeologický Ústav ČSAV, Prague (č.j. 4260/51; 2474/52).

Description: This tumulus was excavated in 1951. It was marked

by an irregular concentration of stones (ca. 2.4×3.4 m), which had been badly disturbed by ploughing. No traces of the burial were detected by the excavators, but some fragments of iron tyres, some iron rings 100 mm in diameter, some iron discs from horse harness, and remains of more than six pottery vessels were found. The iron objects were concentrated under the NW part of the stones, the pottery under the SE part. In the S part of the stone concentration was a piece of wood with fragments of bronze sheet. The horse-gear was apparently found to the S of the wheel remains.

Present location: Apparently the finds are at present in the Archeologický Ústav ČSAV, expositura Závist.

8 AUSTRIA

173 Amstetten

(BH Amstetten, Niederösterreich)

References: Blank 1907, 53–54; Kromer 1960, 105–107.

Description: Five inhumation graves were uncovered during road construction in 1906. The finds included a bronze belt-sheet (Kromer 1960, pl. 2), a bronze pin (ibid. pl. 1, 5), two small rings of fine twisted bronze wire (ibid. pl. 1, 1), two pottery vessels (ibid. pl. 1, 4.6) and seven fragments of iron tyres. The area was subsequently investigated by J. Szombathy, who found two decorated pottery sherds (ibid. pl. 1, 3.7), nine looped rectangular bronze pendants on an iron ring (ibid. pl. 1, 2) and a child's inhumation grave.

Comments: It is not known if the iron tyres were associated with any of the other finds discovered here (for chronological reasons, only Kromer 1960, pls 1, 2–3; 2 come into question). Likewise, it is uncertain whether the wagon-grave was an inhumation flat grave or covered by a tumulus.

Wagon finds:

- 1) Seven fragments of iron tyres, width 25 mm. The tyres were fitted with nails spaced ca. 150 mm apart, the heads of which were countersunk. The longest preserved nail showed a penetration of 54 mm. (Pl. 127E)

Museum: Naturhistorisches Museum, Wien (inv. no. 55. 979).

174 'Austria-Hungary'

Description: A cast bronze angle-socket is housed in the Burgenländisches Landesmuseum, Eisenstadt. It probably came from the territories of the dual monarchy of Austria-Hungary. The author is grateful to Dr K. Kaus, of the Burgenländisches Landesmuseum, who brought this piece to his attention.

Finds:

- 1) One cast bronze angle-socket, consisting of two slightly conical sockets forming a right-angle. On one side of the socket are three circular holes. The object is terminated by two discs, one larger and one smaller, with stepped cross-sections. Between the discs and the sockets the solid bronze rods are each decorated with a pair of ribs. (Pl. 127C)

Museum: Burgenländisches Landesmuseum, Eisenstadt (Sammlung Wolff).

175 Hallstatt, grave 507

(BH Gmunden, Oberösterreich)

References: Kromer 1959, 118–9; Piggott 1983, 161 and 160, fig. 99.

Description: Grave 507 was a very rich cremation burial containing an iron sword, bronze vessels and numerous other goods. Among the finds were four cast bronze linchpins, 90 mm long, with triple-looped heads, each loop holding a ring with a trapezoidal bronze sheet pendant. The linchpins have tapering shafts bent into a hook shape. The ends of the tapering shafts each hold a ring with a trapezoidal pendant (Pl. 127D).

Museum: Naturhistorisches Museum, Wien.

176A Helpfau-Uttendorf, tumulus 2

(BH Braunau am Inn, Oberösterreich)

References: Egg 1985a, 327–337.

Description: This tumulus cemetery comprised six tumuli, five of which were excavated by the Oberösterreichisches Landesmuseum in 1885. The tumuli are remarkable for their size; tumuli 1 and 3 were the largest, with heights of 3.5 and 6 m and diameters of ca. 46 and 62 m respectively. The finds from this cemetery were restored by the Römisch-Germanisches Zentralmuseum, Mainz, in 1984.

Tumulus 2 was 4 m high and 44 m in diameter. The excavators opened a trench from the NE side of the tumulus. In the NE, at a depth of 1.5 m, a burnt layer with pottery sherds was uncovered. At a depth of 2–2.5 m was a large ash layer ca. 24 m in diameter, apparently covered with birch bark. In the middle of this layer were remains of bones, probably cremated, surrounded by grave goods: iron tyres, a nave-head ring, two pottery rings looped together (Egg 1985a, 331, fig. 5, 4), a fragmentary pottery tube (ibid. 331, fig. 5, 3), an iron band 300 mm long (tyre?), sherds of a black and a graphited vessel (ibid. 331, fig. 5, 5), sherds of a red vessel, iron and wooden fragments, and 'wooden tubes' (possibly spokes).

Comments: The paucity of wagon finds suggests to Dr Egg that the tumulus had been robbed.

Wagon finds:

- 1) Two fragments of iron tyres, 32–33 mm wide, ca. 670 mm in diameter. One nail survives and it has a square head measuring 26×28 mm; the surviving fragments show that the nails must originally have been spaced at least 238 mm apart. (Pl. 128, 1)
- 2) Fragment of an iron nave-head ring, 50 mm wide and 130 mm in diameter. On the outer end of the ring are remains of an iron nave-cap, which had been soldered to the nave-head ring with bronze. The inside of the nave-head ring is coated with a thin layer of bronze. The outside of the nave-head ring has inlaid bronze decoration consisting of seven bands of transverse lines and dots-and-circles. (Pl. 128, 2)
- 3) Flat iron fragment with inlaid bronze dot-and-circle decoration. The dots-and-circles seem to have been arranged in a ring. The curvature of the ring of dots-and-circles suggests an object with a fairly large diameter. The fragments may have come from the nave-cap or the flange of an axle-cap. (Pl. 128, 3)
- 4) Flat iron ring with thickened internal edge (external diameter at least 112 mm, internal diameter 56 mm). This could either belong to this grave or to tumulus 5. (Pl. 128, 4)

Museum: Oberösterreichisches Landesmuseum, Linz.

176B Helpfau-Uttendorf, tumulus 5

(BH Braunau am Inn, Oberösterreich)

References: Egg 1985a, 346–377.

Description: Tumulus 5 was in an isolated position, 410 m S of the other tumuli; it measured 1.5 m in height and 38 m in diameter. At a depth of 1.3 m, directly on the natural soil, the excavators found a burnt layer on which was a ring-shaped layer of ash 50 mm thick and 8 m in diameter (Egg 1985a, 347, fig. 18). Most of the ash layer was apparently covered with pear, oak and birch bark. The grave goods were placed on the bark layer. The cremated bones of the burial lay at the N side of the ash layer, under the gold neck-ring. SW of the neck-ring was an iron spearhead and a decorated iron belt-sheet. Directly to the E of the neck-ring were two bronze cauldrons with cross-shaped attachments. A bronze situla was found at the W side of the ash ring. In the SE were two iron horse bits, close to which were at least seven iron cheek-piece terminals. Further remains of iron horse-gear were found at the W side of the ash layer.

The wagon remains were found on the S and SW parts of the ash ring, comprising tyres and nave fittings. By the wagon parts and the situla were remains of wickerwork. At the W side, close to the wagon remains, were two small bronze terminals. The pottery remains mentioned by the excavators were not marked on the plan, and they have been lost.

Comments: The plan of this grave is remarkably similar to that of Pullach-Süd, tumulus 3 (cat. no. 135), in particular the ring-shaped ash layer covered with birch bark. It may not be a coincidence that one of the excavators, H. von Preen, had been schooled in excavation by J. Naue, who had opened the Pullach grave in 1882-3 (Egg 1985a, 323).

Finds:

- 1) Iron tyres, 36-37 mm wide, 890 mm in diameter. The tyres were fastened by nails with transverse long-oval heads, spaced ca. 140 mm apart. (Pl. 130A, 1.4)
- 2) remains of ribbed iron nave fittings. The nave-head was 137 mm in diameter, and was sheathed with ribbed iron sheet. A nave-cap with an axle-channel ca. 52 mm in diameter was affixed to the nave-head sheathing by bronze solder. The nave-neck was 108 mm in diameter and was covered with smooth iron sheet. On each nave-neck were riveted four hollow iron half-cylinders which had filed notched decoration. Like the nave-head, the nave stock was covered with ribbed iron sheet (diameter 151 mm). The iron nave fittings only survive in fragments and it is not possible to establish the length of the naves; however, Dr Egg estimated a length of about 450-500 mm. (Pls 129, 1; 130A, 2-3.5)
- 3) Apart from the ribbed iron sheet nave fittings described above, the finds also included a number of fragments without ribs, which led Dr Egg to suspect that two different pairs of wheels had been used on the wagon. In particular there are two nave-caps, ca. 120 mm in external diameter, 60 mm internal diameter, which seem to preserve remains of smooth iron nave-head fittings (Pl. 129, 2-3). However, it seems possible that these nave-caps could also have been fitted to the naves with ribbed iron sheet. In particular, the fragment of ribbed iron nave-sheathing on Pl. 130A, 3 probably comes from the nave-head. On its underside, remains of smooth iron sheet are preserved, which probably came from a nave-cap of this type.
- 4) Iron fragments, including possible remains of nave-caps (Pl. 129, 4), possible fragmentary felloe-clamps, a fragment of unknown function (Pl. 129, 5), and an iron fragment which could either be from a nave-cap or a razor (Pl. 129, 6).
- 5) Among the objects which cannot be assigned to a specific grave is a fragment of ribbed iron sheet of a type found in other graves with wagons of type 7 (wagon-box decoration type v, Pl. 130A, 7), and a fragment of an iron tube with a profiled iron collar (Pl. 130A, 6). This tube is probably a fragment of the spoke sheathings, although it seems to be very small in diameter. Both these iron fragments probably belonged to tumulus 5.
- 6) Two small bronze socketed terminals, broken. (Egg 1985a, 353, fig. 23, 8-9)
- 7) Two iron horse bits. (ibid. 354, fig. 24, 7-8)
- 8) Seven iron socketed terminals with spherical ends, from wooden cheek-pieces; length 95 mm. The terminals were made of iron sheet soldered together with bronze. (ibid. 353, fig. 23, 1-7)
- 9) Iron 'S'-shaped hook with a conical head, fastened to a 'U'-shaped staple. Probably a rein-hook. (ibid. 355, fig. 25, 7)
- 10) One iron phalera, 98 mm in diameter. In the centre of the phalera is a hemispherical boss surrounded by four concentric ribs; the rim of the phalera is 'wavy', each 'wave' being perforated. On the rear side of the phalera are four patches of bronze solder, which served to fasten two iron loops. (ibid. 354, fig. 24, 1)
- 11) Iron rein-knob with hemispherical boss and circular flange, diameter 49 mm. The knob was assembled from three pieces of iron sheet which were soldered together. (ibid. 354, fig. 24, 2)
- 12) Two iron knobs with central boss and stepped profile, diameter 25 and 28 mm. (ibid. 354, fig. 24, 3-4)
- 13) Two iron rein-knobs, each comprising a pair of hemispherical bosses. A loop was fastened to the rear side with bronze solder. (ibid. 354, fig. 24, 5-6)
- 14) 12 small iron rein-knobs, 15-18 mm in diameter. (ibid. 354, fig. 24, 9-20)
- 15) Two band-shaped iron loops. (ibid. 355, fig. 25, 1-2)
- 16) Disc-headed iron nails. (ibid. 355, fig. 25, 3-4)
- 17) Looped iron rod. (ibid. 355, fig. 25, 5)
- 18) Iron loop. (ibid. 355, fig. 25, 6)
- 19) 12 iron rings and four fragments, diameters 31-41 mm. (ibid. 355, fig. 25, 8-23)
- 20) Gold neck-ring. (ibid. 349, fig. 19)
- 21) Iron belt-sheet with embossed decoration. (ibid. 350, fig. 20, 1)
- 22) Iron spearhead. (ibid. 350, fig. 20, 2)
- 23) Bronze situla, height ca. 890 mm. (ibid. 356, fig. 26)
- 24) Two bronze cauldrons with cross-shaped handle attachments. (ibid. 357, fig. 27)
- 25) Remains of wickerwork. (ibid. pl. 42, 1)
- 26) Pottery sherds, lost.

Museum: Oberösterreichisches Landesmuseum, Linz.

177 Lengau, 'Galgenholz', tumulus 1

(BH Braunau am Inn, Oberösterreich)

References: Anon. 1900, LIV-LV; Straberger 1902, 89-90; Reitingner 1968, 230-231.

Description: This tumulus was excavated in 1899, and measured 12 m in diameter with a height of 1 m. In the Oberösterreichisches Landesmuseum, there is a manuscript description of the tumulus, and a plan of the findings (Fig. 216). The excavators opened an E-W trench 5 m long and 2 m wide, from the E side of the tumulus. In the middle, 500 mm below the surface, was a collection of burnt bones and charcoal (Fig. 216, 1). In the NW, 500 mm below the surface, was a layer of a few flat stones (Fig. 216, 2) on which, in the midst of some black earth, were the

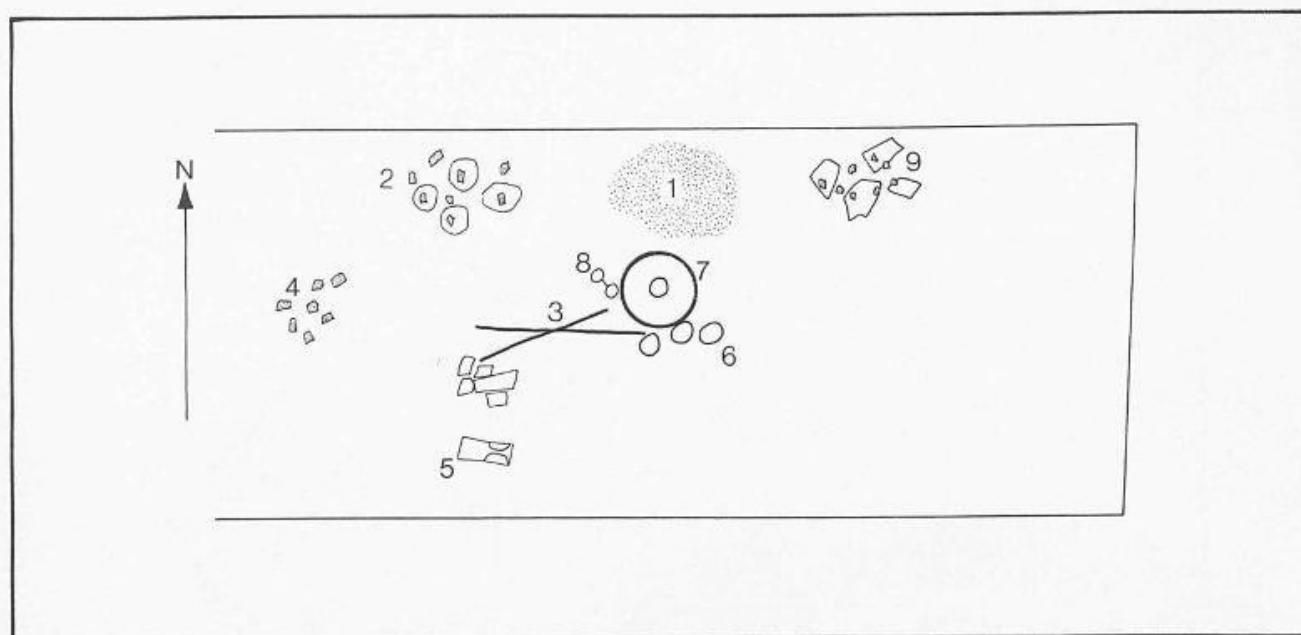


Fig. 216 Lengau, 'Galgenholz', tumulus I: plan of the excavated area. – Scale 1:40.

sherds of a handled pottery cup (Pl. 130B, 5). The tumulus base consisted of a hard mud layer on which were some iron fragments (including three fragments of an iron spear), and an iron tyre (Fig. 216, 3) which had been squashed flat and formed two ca. 1.1 m long iron strips, orientated roughly E-W. To the W of these tyre fragments, also on the tumulus base, were the sherds of a pottery vessel (Fig. 216, 4; Pl. 130B, 8). S of the pot was an iron flanged axe (Fig. 216, 5). To the E of the tyre fragments were several nave-ring fragments (Fig. 216, 6), 120–130 mm in diameter, and an iron tyre (Fig. 216, 7) ca. 900 mm in diameter. In the middle of the tyre were iron nave fittings, 120–130 mm in diameter, and some other iron fragments. To the W of the wheel was an iron horse bit (Fig. 216, 8) and other iron fragments. NE of the wheel, ca. 300–400 mm above the natural soil, was a large stone and some coarse sherds (Fig. 216, 9).

Comments: The excavators only seem to have uncovered part of this grave. All the finds probably came from the same cremation grave.

Finds:

- 1) Numerous fragments of iron tyres, 31 mm wide and ca. 900 mm in diameter. The nail-heads are countersunk. The nails were spaced ca. 125 mm apart and had a maximum penetration of 44 mm. (Pl. 130B, 7)
- 2) About 13 fragments of iron nave bands, 18–19 mm wide and ca. 120–130 mm in diameter. They carry transverse wood grain. (Pl. 130B, 1–3)
- 3) Iron horse bit (lost).
- 4) One fragment of an iron spearhead. (Pl. 130B, 6)
- 5) Iron flanged axe, 217 mm long. (Pl. 130B, 4)
- 6) Pottery bowl, rim diameter 152 mm, height 73 mm. On the shoulder are four groups of four diagonal channels. The outside of the vessel is graphited, the inside is light grey-brown. (Pl. 130B, 8)
- 7) Handled cup, maximum diameter 120 mm, height 65 mm. The outside and inside of the vessel are a natural grey colour. (Pl. 130B, 5)
- 8) Coarse sherds (lost).

Museum: Oberösterreichisches Landesmuseum, Linz (inv. nos A. 1719, 1737 and 2359).

178A Mitterkirchen, tumulus II, grave 1

(BH Perg, Oberösterreich)

References: Pertlwieser 1982; *ibid.* 1983; *ibid.* 1987; *ibid.* 1988.

Description: Excavations have been taking place in the Mitterkirchen cemetery since 1981, and at least 28 tumuli with 54 chamber graves have been uncovered. Tumulus II seems to have been the largest in the cemetery. The primary grave was robbed in antiquity, but some pottery remains, iron wagon fittings and fragmentary bronze wagon-box ornaments remained in the chamber. In the grave-robber's tunnel the excavators found an iron spearhead and a decorated gold ear-ring (Pertlwieser 1987, 48, fig. 1).

The tyres from this grave had a curved cross-section and a width of about 27 mm. The naves were fitted with angular nave-head rings (Fig. 65, 1); further nave fittings do not seem to have been found.

Museum: Oberösterreichisches Landesmuseum, Linz.

178B Mitterkirchen, tumulus X, grave 1

(BH Perg, Oberösterreich)

References: Pertlwieser 1982; *ibid.* 1983; *ibid.* 1987; *ibid.* 1988.

Description: This grave was the central burial in tumulus X. The wooden grave chamber measured 3.4 × 3.0 m (Fig. 217). In the NE corner was a large quantity of pottery vessels, alongside which was a spindle whorl. Another group of vessels was positioned in the centre of the chamber. In the NW corner were numerous animal bones and two iron knives. The inhumation burial was positioned with the head to the E, parallel with the W wall of the chamber. The personal goods included a necklace of amber beads, two 'spectacle' fibulae, a belt-hook and six ankle-rings. The burial lay among the remains of a wooden

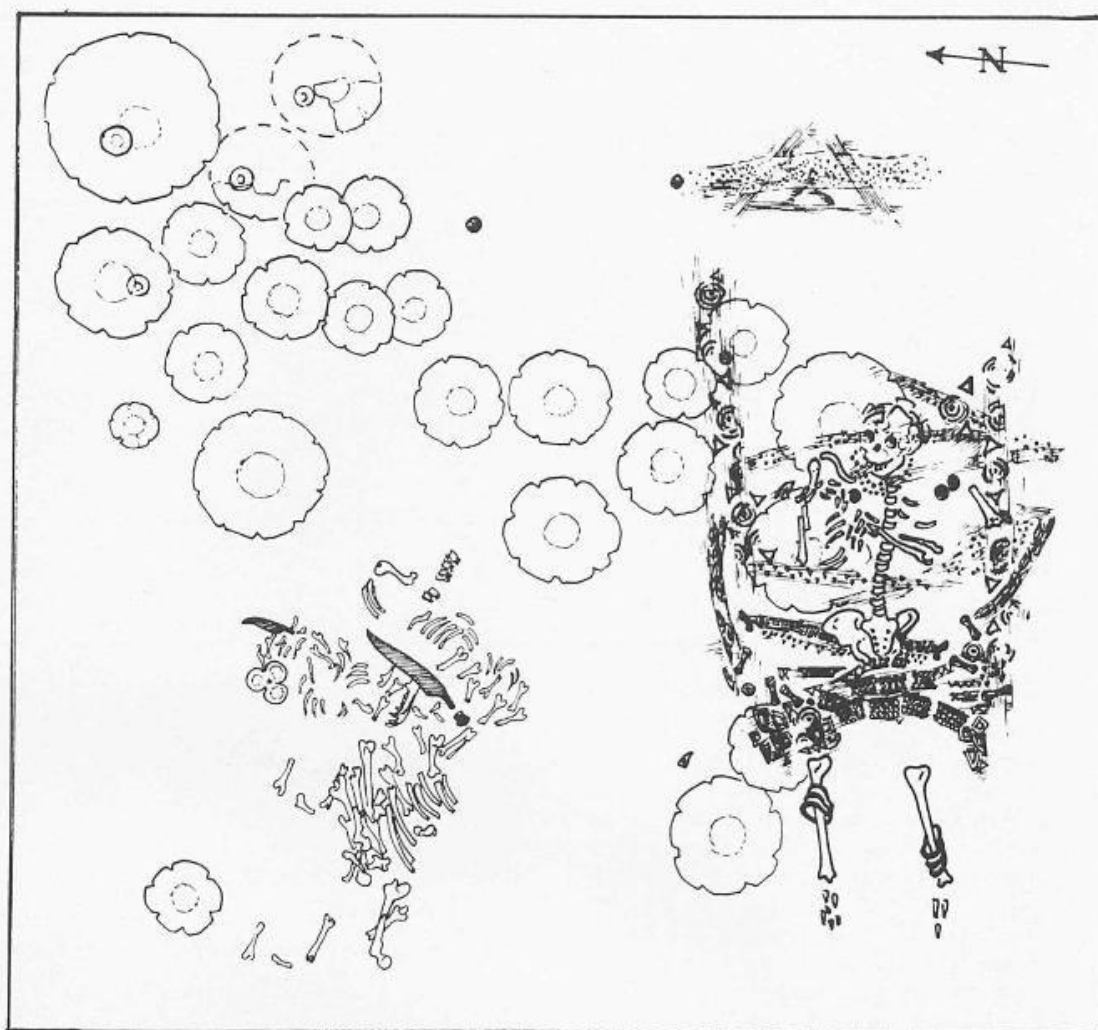


Fig. 217 Mitterkirchen, tumulus X, grave 1: plan of the grave chamber (after Pertlwieser 1987). – Scale 1:25.

construction richly decorated with bronze ornaments. A number of pottery vessels were found under the inhumation, showing that the wooden construction was raised above the level of the grave floor. At the E end of the wooden construction were the remains of a yoke, with typical bronze fittings (Pertlwieser 1987, 51, figs 7–8).

The wooden construction can be interpreted as a richly decorated wagon or wagon-box. The top and bottom of the sides were formed by wooden rods, between which was a band of leather bearing ornaments in the form of concentric circles with central hemispherical-headed nails and nailed triangles (Fig. 73, 1). The wagon-box measured 0.80–0.85 × 1.70–1.80 m. The rear end of the box was even more elaborate, and higher than the sides. It had three rows of pendent openwork bronze plaques, hanging in a richly decorated framework of wooden rods flanked by columns fitted with ribbed bronze cylinders (Fig. 73, 2). This decoration is typical for wagon-box type ii.

Museum: Oberösterreichisches Landesmuseum, Linz.

179 Salzburg-Taxham

(BH Salzburg Stadt, Salzburg)

References: Moosleitner 1982a, 469–488.

Description: This tumulus, ca. 40 m in diameter and before

agricultural activity 1.5 m high, suffered from uncontrolled excavation in 1936 and 1951, before being excavated by M. Hell (1951) and F. Moosleitner (1972). The uncontrolled excavations of 1936 and 1951 both uncovered a burnt layer on the natural soil; within the burnt layer cremated bones, sherds and fragments of a ribbed bronze bucket were discovered. Although the tumulus had been badly damaged by ploughing, uncontrolled excavation and road building, F. Moosleitner was able to offer an account of the tumulus contents.

Roughly in the centre of the tumulus were the remains of an *in situ* cremation pyre: a burnt layer ca. 100 mm thick and ca. 5–5.5 m in diameter with a central post-hole (Moosleitner 1982a, 473, fig. 2). Scattered in the burnt layer were the grave goods. In the undisturbed W part of the burnt layer were two piles of cremated human bone; four further piles of cremated human bone were found to the W outside the burnt layer. In the rest of the burnt layer, fragments of cremated human and animal bones were also found. The exact number of bodies represented by the cremated bone could not be determined, but the quantity seems to indicate at least five to six individuals.

Comments: Hell thought that this grave had been robbed and disturbed in antiquity. In contrast, Moosleitner considered that the grave was intact (at least until 1936!). Moosleitner argued that the tumulus held a contemporary multiple burial. Nevertheless, he noted that the majority of finds would correspond to a

rich male grave (dagger, spears, wagon), although a female component could also perhaps be detected (amber ring, agate bead).

Finds:

- 1) Fragments of iron nave fittings, maximum diameter of nave 147 mm, axle-channel diameter 55–57 mm. The nave fittings presumably consisted of nave-neck sheathings, nave-head rings (each with two pairs of engraved lines) and ribbed nave-caps. On one piece of iron sheet, a fragment of a simple iron linchpin is preserved. On Moosleitner's reconstruction of the nave fittings (Pl. 131A, 1–2), the nave-cap is slightly different from the normal naves of Breitenbrunn type, here with two or three ribs. The author has examined the few surviving fragments of the nave-cap, and does not feel that this atypical reconstruction can be justified. (Pl. 131A, 1–2)
- 2) Three fragments of iron nailed bands, 32–40 mm wide. (Pl. 131A, 3–5)
- 3) Three fragments of iron sockets with thickened ends, length 123 mm. (Moosleitner 1982a, 481, fig. 9, 44–45)
- 4) 10 iron nails and other iron fragments. (ibid. 481, fig. 9, 46–55)
- 5) Fragments of an iron antenna dagger and bronze chape (ibid. 477, fig. 6, 24–25); fragments of a bronze sheet dish with horizontal rim decorated with two rows of bosses, and with a horizontal handle (ibid. 477, fig. 6, 33); fragments of bronze sheet from a ribbed bucket (lost); remains of an iron (?) arrowhead (ibid. 477, fig. 6, 26); four fragments of at least two iron spearheads (ibid. 477, fig. 6, 27–30); two fragments of a bronze band (ibid. 477, fig. 6, 31); one fragment of a bone toggle (ibid. 477, fig. 6, 32); amber ring (ibid. 475, fig. 4, 1); 'T'-shaped iron fragment, possibly a belt-hook (ibid. 475, fig. 4, 2); agate bead (ibid. 475, fig. 4, 3); profiled bronze bead (ibid. 475, fig. 4, 4); bronze pin, probably from a fibula (ibid. 475, fig. 4, 5); fragments of iron rings (ibid. 475, fig. 4, 6.19); 15 small bronze rings (ibid. 475, fig. 4, 7–16.18.20–23); ribbed bronze rod fragment, one end seems to be forked (ibid. 475, fig. 4, 17); iron ring fragment, 56 mm in diameter (ibid. 480, fig. 8, 43); sherds of four pottery vessels (ibid. 479, fig. 7, 34–37).

Museum: Salzburger Museum Carolino Augusteum, Salzburg.

180 Strettweg

(BH Judenburg, Steiermark)

References: Robitsch 1852, 74; Weinhold 1859, 212; Lindenschmit 1860, 137; Much 1889, 98, pl. 41; Schmid 1934; Egg, Forthcoming 2.

Description: This tumulus grave was discovered during ploughing in 1851: the farmer came across stones and numerous rich grave goods. At that time, the tumulus had already almost been levelled and measured only 500 mm in height. The tumulus was investigated in 1852. In the middle was a stone core. The burial was a cremation, contained in a large bronze amphora. Further finds came to light even after 1852.

It is strange that although Robitsch, Weinhold, Lindenschmit, and Much all wrote that the grave contained iron tyres from a full-size wagon, this was ignored by Schmid. Thus: '... zwei Segmente von einem halben Zoll (14.6 mm) dicken und $\frac{3}{4}$ Zoll (19.5 mm) breiten eisernen Reife, welche der Größe nach auf ein großes Wagenrad passen würde' (Robitsch 1852, 74); 'Von Eisen kennt man ... Theile eines Radbeschlages' (Weinhold 1859, 212); 'In der Steiermark bei Judenburg wurden auch

große eiserne Radreifen bei dem berühmten kleinen Erzwagen ... aus einem Grabhügel erhoben' (Lindenschmit 1860, 137).

Finds:

- 1) Iron tyres $\frac{1}{2}$ " (14.6 mm) thick and $\frac{3}{4}$ " (19.5 mm) wide. Lost.
- 2) Bronze 'cult-wagon' (Schmid 1934, pls 7–19); fragments of numerous bronze vessels, including an amphora, a jug, some 'Breitrandschalen', a situla, a sieve, and fragments of other vessels (ibid. pls 2, 1–5; 3, 1–2; p. 11, fig. 2; 12, fig. 3); five cast bronze handles from iron spits (ibid. pl. 4, 1–2); one iron spit handle (ibid. pl. 4, 3); bronze pendant (ibid. pl. 4, 4); bronze wheel-shaped pendant (ibid. pl. 6, 8); decorative bronze rein-rings (ibid. 14, fig. 4); embossed square bronze sheet plaques (ibid. pl. 4, 5–11); seven amber beads; gold wire ring (ibid. pl. 4, 13); ribbed gold bead (ibid. pl. 4, 12); bronze socketed axe (ibid. pl. 5, 1); iron spearhead (ibid. pl. 5, 2); another iron spearhead; nine bronze sheet embossed phalerae (ibid. pl. 5, 4–5); rectangular bronze sheet bands with embossed point-bosses, used as decoration for the reins (ibid. pl. 5, 3); small bronze phalera; two iron horse bits (ibid. pl. 6, 1–3); one bronze toggle (ibid. pl. 6, 4); five bronze rings (ibid. pl. 6, 7); sherds from at least 10 pottery vessels (including ibid. 20, figs 5–6).

Museum: Landesmuseum Joanneum, Graz (wagon tyres lost).

181 Wörgl, 'Egerndorfer Wald'

(BH Kufstein, Tirol)

References: Mérey-Kádár 1958, 450–452; Mérey-Kádár 1959, 47–50 and 123–136.

Description: This cemetery has been the subject of a number of excavations, beginning in 1838. The graves range in date from the Urnfield period to the second century A.D. The finds in the Landesmuseum Ferdinandeum, Innsbruck, derive from the excavations of 1843–4 (see Mérey-Kádár 1958 and 1959). Sadly, the surviving archive material is not sufficient to assign the wagon components to any specific grave. The iron tyres and nails described below probably belong to the Hallstatt period, although their chronology is uncertain owing to the lack of associated finds (see Mérey-Kádár 1959, 49, nos 83–84). The other iron objects published by Mérey-Kádár seem to be later in date (1959, pls 3; 5–8).

Wagon finds:

- 1) 27 fragments of iron tyres, some of which with iron nails, and 53 further iron nails. The tyres are about 20 mm wide with a flat profile, and are provided with rectangular holes for the nails, spaced 60–80 mm apart. The nails have long oval heads measuring 36–49 mm in length and 12.5–15 mm in width. Many of the nail shanks are complete and were bent over, showing a penetration of 82–107 mm. With a tyre thickness of ca. 4 mm, this indicates a felloe height of 78–103 mm. (Pls 131B; 132A)

Museum: Landesmuseum Ferdinandeum, Innsbruck (inv. nos 2619–2651, 2705–2707, 3644–3686 and 3692–3701).

9 HUNGARY

182 Somlóvásárhely, tumulus I

(Kom. Veszprém, Hungary)

References: Horváth 1969, 109ff.

Description: This tumulus was excavated by Gy. Rhé in 1928. It

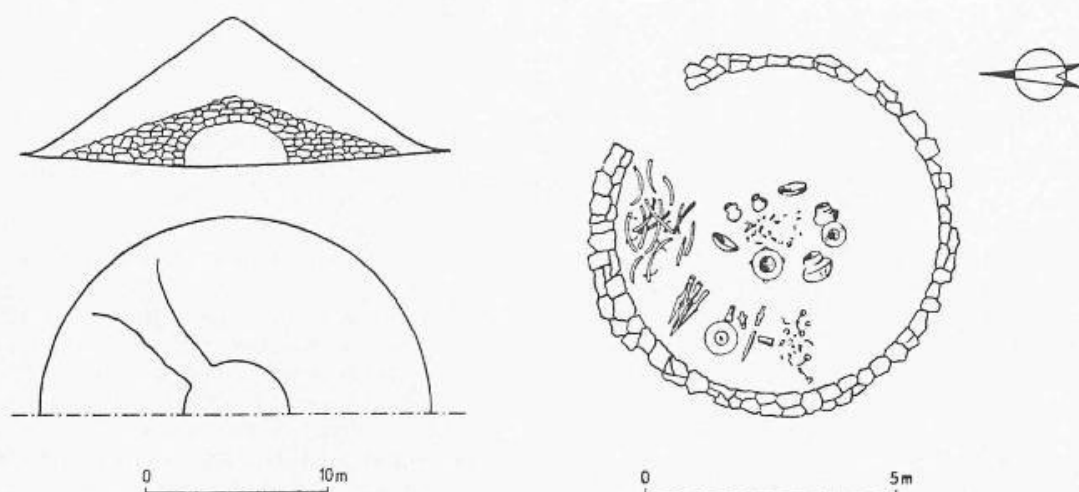


Fig. 218 Somlóvásárhely, tumulus I: plan of the central grave (after Bakay et al. 1970).

measured 20–22 m in diameter and enclosed a large stone core. In the middle of the stone core was a stone-free area ca. 6–7 m in diameter, which was supposed to have had an entrance to the NE (Fig. 218).

On Rhé's plan, the cremated bones were located in the centre of the circular stone-free area. The S and E parts of the stone-free area were empty. At least eight pottery vessels are shown on the plan, located around the cremation. To the SW were two iron horse bits and other elements of the horse harness. Just to the N of the horse harness was an iron sword. A single bronze phalera was found to the N of the sword, and further N were the five iron spearheads and three axes; finally, just to the W of the 'entrance', were the iron tyre fragments.

Finds:

- 1) Numerous iron tyre fragments, ca. 35 mm wide and ca. 680 mm in diameter. The tyres were fitted every 120–210 mm with long nails (up to 175 mm in length!) with small countersunk, or slightly projecting, heads. (Horváth 1969, 113, fig. 7; 114, fig. 9, 11)
- 2) Two bronze discs, with engraved diagonal lines on their thickened internal rims; external diameter 70 mm, internal diameter 40 mm. On one example, the outline of the opening is misshapen owing to differential wear. (ibid. 111, fig. 4, 1–2)
- 3) Two iron horse bits, of which one is lost. The shanks are twisted and each end carries an iron ring. (ibid. 114, fig. 9, 12)
- 4) Five bronze rein-knobs with a central spike and a single loop on the rear side, and with four pairs of loops on the rim. One rein-knob is lost. (ibid. 111, fig. 4, 3–5.7)
- 5) Two bronze ring-footed rein-knobs with a central spike. (ibid. 111, fig. 4, 8–9)
- 6) Two bronze ring-footed rein-knobs with a central spike and openwork four-spoked design. (ibid. 111, fig. 4, 6)
- 7) One bronze phalera, 250 mm in diameter. (ibid. 112, fig. 5)
- 8) Iron sword, 950 mm in length. Lost. (ibid. 114, fig. 9, 10)
- 9) Five iron spearheads and one iron spearhead socket fragment. (ibid. 112, fig. 6, 1–4.7)
- 10) Iron trunion axe ('Ärmchenbeil'), 170 mm in length. (ibid. 112, fig. 6, 8)
- 11) Iron flanged axe. (ibid. 112, fig. 6, 5)
- 12) Iron shaft-hole axe. (ibid. 112, fig. 6, 6)
- 13) Fragment from the head of a bronze pin. (ibid. 111, fig. 4, 10)
- 14) Two pieces of embossed bronze sheet. (ibid. 111, fig. 4, 11–12)

- 15) Eight pottery vessels are marked on Rhé's plan; however, sherds from many more vessels survive. (ibid. 128, fig. 29, 1)

Museum: Veszprém Museum.

10 YUGOSLAVIA

183 Gornja Radgona

(opština Gornja Radgona, Slovenia)

References: Schmid 1934, 28 and note 19; Pahič 1966, 122–128; Egg 1986a; Teržan 1990, 84–9; 340–42.

Description: This tumulus was excavated in 1830. The grave is well-known under the name Radkersburg. Except for the sword, the finds are lost today, and only an illustration survives. The finds include remains of a large wagon (angle-sockets) and a bronze model wagon.

Comments: The finds are now lost, but were originally housed in Schloß Freudenau, near Mureck. According to information from Dr A. Harding, the sword is now in the British Museum.

Finds:

- 1) Four 'L'-shaped angle-sockets, made from two cylinders of unequal size. The longer socket was 109 mm long, the shorter was 86 mm in length. The ends of the sockets are ribbed and the join of the two cylindrical arms is topped by a knob with diagonal ribs. (Egg 1986a, 201, fig. 2, 4)
- 2) Bronze sword related to the Tachlouice type, broken into three fragments. (ibid. fig. 2, 1)
- 3) Bronze socketed axe, length 178 mm. (ibid. fig. 2, 2)
- 4) Bronze ring with five small rings on its rim. Diameter 52 mm. (ibid. fig. 2, 8)
- 5) Bronze knobbed pin (*Knopfnadel*).
- 6) Five iron spearheads.
- 7) Remains of the pottery cremation urn.
- 8) Four bronze eight-spoked wheels, diameter 138 mm. They were provided with bronze axles, 80 mm long. (ibid. fig. 2, 5)
- 9) Another, smaller bronze wheel.
- 10) Twisted bronze rods, riveted to the wheels' axles. (ibid. fig. 2, 6)
- 11) Bronze ring-shaped 'flesh-hook', with a long socket and seven spikes. Length 158 mm. (ibid. fig. 2, 7)
- 12) Fragment of a bronze vessel or, according to the theory of M. Egg, a bronze helmet. (ibid. fig. 2, 3)

Addenda to the Catalogue

Since completing the catalogue of 228 wagon-graves, a further 14 examples have come to light – bringing the total number of Hallstatt wagon-graves in the area studied (Fig. 4) to 242. For the purposes of Figs 108–9, the new graves have been dated as follows: Ha C1 (Moritzbrunn, Pilsting-Oberndorf), Ha C (Pilsting-Waibling, Praha-Vinoř, Riedenburg-Untereggersberg, Wörgl), Ha D1 (March-Buchheim, Riedenburg-Deising), Ha 2–3 (Elm-Sprengen, Diarville, Kerling-les-Sierck).

- 1) *Elm-Sprengen, Gde. Schwalbach, Ldkr. Saarlouis, tumulus 3*: Excavations of this tumulus (diameter 20 m, height 0.80 m) in 1988 uncovered a grave pit measuring 2.9 × 2.0 m, oriented NW–SE. The grave contained iron tyres from a four-wheeled wagon and a gold ear-ring. The grave may have been plundered in antiquity. See Reinhard 1990.
- 2–4) *Diarville, dép. Meurthe-et-Moselle*: Excavations led by L. Olivier and W. Reinhard in 1990 uncovered three wagon-graves. The wagon-grave in tumulus 02 had been disturbed in 1860 and partially excavated in 1888. It contained numerous iron fragments (including tyres and nave-caps), a 'sword', bronze vessels (including a ribbed bucket), and a band of gold sheet measuring 3 × 40 cm. The wagon-grave in tumulus 02 was a secondary grave, overlying a primary Ha C sword-grave; in turn, secondary graves dating to Ha D2/3 were buried in the wagon-grave's tumulus. The wagon-grave therefore dates to the Hallstatt period – judging from the finds probably Ha D2/3 (gold neck-ring; a dagger is more likely than the reported sword).

The two wagon-graves in tumulus 07 were undisturbed. The graves both housed female inhumations of Ha D2/3, the wagon fittings are of type 6.

A preliminary report of the excavations will be published by L. Olivier in 1991: *Les tombes à char du Hallstatt Récent du groupe de tumulus de Diarville 'Devant Giblot' (Meurthe et Moselle)*. *Archäologisches Korrespondenzblatt* 21, 1991.

- 5) *Kerling-les-Sierck, 'Neuwiese', dép. Moselle*: L. Olivier has uncovered information about a wagon-grave excavated by amateurs in 1934 at Kerling-les-Sierck. According to Olivier, the wagon had four wheels and probably belonged to type 6.
- 6) *March-Buchheim, Kreis Breisgau-Hochschwarzwald, 'Bürgle'*: Apart from horse-gear, a bronze vessel, ivory knobs etc., this huge tumulus (diameter 120 m, height 3.5 m) also contained remnants of iron tyres. See Wagner 1885, 24–26; Bittel et al. 1981, 424–5; Pare, Forthcoming 3.
- 7) *Moritzbrunn, Kreis Eichstätt*: Since writing about the finds from Moritzbrunn in Ch. 7.2, the author studied the

finds from this grave in the Germanisches Nationalmuseum, Nürnberg, and found a fragmentary bronze band from a nave. This demonstrates that the Moritzbrunn grave certainly contained a wagon – doubtless of type 2. See Pare, Forthcoming 2.

- 8) *Pilsting-Oberndorf, Kreis Dingolfing-Landau tumulus 2*: a rich Ha C1 grave containing an inhumation with an iron sword, a four-wheeled wagon, horse-gear including yoke components, and numerous pottery vessels has recently been excavated. See L. Kreiner, *Ein Wagengrab der Hallstattzeit aus Pilsting-Oberndorf, Lkr. Dingolfing-Landau, Ndb.* In: *Ausgrabungen und Funde in Altbayern 1989–1991* (Exhibition catalogue, Straubing 1991), 54–5.
- 9) *Pilsting-Waibling, Kreis Dingolfing-Landau*: Stray finds from a rich tumulus of Ha C include fragments of iron tyres. See Kreiner 1987, 118.
- 10) *Praha 9 – Vinoř*: Recent excavations have uncovered a new Ha C wagon-grave in Prague. The publication of the finds is being prepared by M. Fridrichová, Han-spaulka Museum, Prague.
- 11) *Riedenburg-Deising, Ldkr. Kelheim, tumulus 2*: Recent excavations of this tumulus (diameter 31 m) uncovered a very large grave chamber, measuring 7 × 8 m. Among other things, the grave contained iron and bronze wagon components and harness fittings for a pair of horses. See Hoppe 1988, 37–40. See also: *Bayerische Vorgeschichtsblätter*, Beiheft 3, 1990, 59f., figs 43–4.
- 12–13) *Riedenburg-Untereggersberg, Ldkr. Kelheim*: Excavations in 1989 lead to the discovery of tumulus 26 with a large grave chamber, measuring 4.5 × 5 m, containing remains of a four-wheeled wagon. The wheels had a diameter of 0.80 m, and the wagon had a wheel base of 1.5 m with a wheel gauge of 1.2 m. The N–S orientated inhumation probably originally lay on the wagon box. Apart from the wagon, the grave goods included harness for two horses and numerous pottery vessels. Tumulus 31 from this cemetery contained a second wheeled vehicle, in a chamber measuring 4.5 × 5.2 m. According to the excavators, the vehicle was two-wheeled. Like the first grave, this vehicle-grave also contained numerous pottery vessels and horse harness. See Mahler 1989. See also: M. Hoppe, *Das hallstattzeitliche Gräberfeld von Riedenburg-Untereggersberg, Lkr. Kelheim. Vorträge 10. Niederbayerischer Archäologentag* (1992) 75–88.
- 14) *Wörgl, BH Kufstein, Tirol*: Recent excavations have uncovered another wagon-grave from this cemetery (see cat. no. 181), containing tyres with large-headed nails (type A or C) and iron felloe-clamps. The finds are exhibited in the Landesmuseum, Innsbruck.

Appendix

List of Horse-Gear

This list comprises the finds of horse-gear included on Figs 101, 103, 106 and 135. The grave finds used for Fig. 135 (graves without wagons but with horse harness) are marked with an asterisk; the riveted horse bits of Szentcs-Vekerzug type have been mapped after the collection by W. M. Werner (1985, 470, map 2; see now *ibid.* 1988). In the case of the finds of 'rich horse-gear' of Ha C (Fig. 101), the type numbers (1–15) refer to Fig. 100:

- 1) Bronze horse bits with rein-rings
- 2) Cheek-pieces of Kossack type Ic
- 3) Cheek-pieces of Kossack type Ib
- 4) Hemispherical ring-footed rein-knobs
- 5) Tutulus-shaped rein-knobs
- 6) Tutulus-shaped rein-knobs with looped decoration
- 7) Double rein-knobs
- 8) Bronze rings with hexagonal or octagonal cross-section
- 9) Rein-rings of type Leibnitz
- 10) Classic forms of bronze toggle
- 11) Oval bronze plaques from yoke terminals
- 12) 'Jochschnallen' with anchor-shaped terminals
- 13–15) The three typical forms of 'Jochschnalle'

I. SWEDEN

- 1)* *Annelöv, Scania, urn grave*: This grave contained the burnt remains of two bronze horse bits, as well as other fragments of horse-gear. Rich horse-gear: type 10 (and probably also type 1). Vifot 1932, 145–7; 154; 147, fig. 7.

II. HOLLAND

- 1)* *Meerlo, tumulus cremation grave*: Two iron bits and four iron cheek-pieces indicate paired harness for draught horses. Rich horse-gear: type 2 (iron). Verwers no date, 6–9.
- 2)* *Oss, tumulus cremation grave*: Two iron bits, four iron cheek-pieces and two oval bronze yoke 'rosettes' certainly indicate paired harness for draught horses. Rich horse-gear: types 3 (iron), 6, and 11. Modderman 1964.
- 3)* *Overasselt*: This grave contained a bronze situla with cremated bone and burnt remains of bronze horse-gear. The date of the grave is uncertain, but Kimmig suggested an early La Tène date (1963, 57). For an illustration of the finds, see now: Schatkamer van Gelderse Oudheden. Exhibition catalogue, Museum G. M. Kam, Nijmegen (1989) 17, fig. 6.
- 4) *Wijchen, Prov. Gelderland, urn grave*: Rich horse-gear: types 1 and 4. See cat. no. 1; Pl. 5, 13–14.22–23.

III. BELGIUM

- 1)* *Court-St.-Etienne, tumulus A*: An openwork bronze plaque, although atypical, should be interpreted as a *Jochschnalle*, indicating harness for a pair of draught horses; only two

cheek-pieces survived the cremation pyre, in a fragmentary condition. Mariën 1958, 25, fig. 3.

- 2)* *Court-St.-Etienne, tumulus Z*: Only one fragmentary cheek-piece remained in this cremation grave. Mariën 1958, 85, fig. 12, 114.
- 3)* *Court-St.-Etienne, tumulus 3*: Two iron bits and four iron cheek-pieces indicate paired harness. Rich horse-gear: type 3 (iron). Mariën 1958, 110, fig. 18, 211–212.
- 4)* *Court-St.-Etienne, tumulus 4*: Two oval bronze yoke 'rosettes' indicate harness for paired draught horses. Rich horse-gear: type 11. Mariën 1958, 129, fig. 20, 131.
- 5) *Court-St.-Etienne, stray finds*: Rich horse-gear: types 5 and 9. Mariën 1958, 72, fig. 9, 123–124.128.
- 6)* *Morimoinne, c. Limal, 'Tombelle de Morimoinne'*: Only one iron bit and an iron cheek-piece were found in this grave. Rich horse-gear: type 3 (iron). Mariën 1958, 217, fig. 40, 3.

IV. FRANCE

- 1)* *Chavéria, dép. Jura, tumulus 16*: Two bronze bits and four bronze cheek-pieces indicate harness for a pair of draught horses. Vauillat 1977, 97, fig. 62, 1–2.
- 2)* *Mailhac, dép. Aude, 'Grand-Bassin P, grave 68'*: The two iron bits indicate harness for a pair of horses. Rich horse-gear: type 4. Taffanel and Taffanel 1962, 30, fig. 27, 59–60.79–84.
- 3)* *Mailhac, dép. Aude, 'Grand-Bassin P, grave 99'*: The two iron bits and four bronze cheek-pieces indicate harness for a pair of horses. Rich horse-gear: type 4. Taffanel and Taffanel 1962, 12, fig. 9; 13, fig. 10.
- 4)* *Saulces-Champenoises, dép. Ardennes, cremation grave*: A typical bronze *Jochschnalle* indicates harness for paired draught horses; otherwise only a few bronze rein-knobs, two phalerae and a fragmentary iron bit were found in this disturbed grave. Rich horse-gear: type 15. Flouest 1985, 540–541; 549, fig. 4.

V. SWITZERLAND

- 1)* *Dörflingen, Kt. Schaffhausen, tumulus grave*: A bronze bit, without associated finds, came to light in this tumulus group. Rich horse-gear: type 1. Ruoff 1974, pl. 51, 6.
- 2) *Ins, Kt. Bern, tumulus VI of 1848, lower grave*: Rein-knob with central hemispherical boss and narrow flange (Figs 102, 12–13; 103, 1). Drack 1958a, 37, fig. 37, 38; Kossack 1970, 114, fig. 12, 11–12. See cat. no. 29B.

VI. BADEN-WÜRTTEMBERG

- 1) *Albstadt-Ebingen, 'Schmiechtal', Zollernalbkreis, excavations of 1932–4, tumulus 2*: Rich horse-gear: type 10. Zürn 1987, 212; pl. 448C, 2.
- 2) *Albstadt-Ebingen, 'im Rauemwiesle', Zollernalbkreis*: Rich

- horse-gear: type 4. Zürn 1987, 213, cat. no. B2, Best. 2.
- 3)* *Albstadt-Tailfingen, Zollernalbkreis, tumulus of 1926*: This tumulus grave contained two oval bronze yoke terminals and a typical bronze *Jochschnalle*, certainly the remains of harness for paired draught horses. Rich horse-gear: types 4, 11 and 13. Hülle 1927, fig. 3; Anon. 1928, 44–45 ('Truchteltingen'); Zürn 1987, 216–7; pl. 470A.
- 4) *Altheim-Heiligkreuztal, Kreis Biberach, 'Hohmichele', grave VI*: Rein-knobs with hemispherical boss and broad flange (Figs 105, 1; 106, 4). Rick and Hundt 1962, pls 4, 37–42; 5, 43–54. See cat. no. 51B.
- 5)* *Bad Rappenau, Kreis Sinsheim, tumulus A*: The two iron bits and four iron cheek-pieces indicate harness for a pair of horses. Rich horse-gear: types 3 (iron variant), 6, 7 and 10. Wagner 1911a, 348–350; 349, fig. 285; Nellissen 1975, 183–185.
- 6)* *Bittelbrunn, Kreis Konstanz, tumulus I*: The two iron bits and four iron cheek-pieces indicate harness from a pair of horses. Rich horse-gear: types 3 (iron) and 4. Rest 1939, 4–5.
- 7) *Breisach-Gündlingen, Kreis Breisgau-Hochschwarzwald, 'Zwölferbuck'*: Rich horse-gear: type 4. See cat. no. 56; Pl. 32B, 12.
- 8) *Buchheim am Kaiserstuhl, Gde. March, Kreis Breisgau-Hochschwarzwald*: Rein-knobs with central point and broad flange (Fig. 106, 1). Wagner 1885, 24–6; pl. 3, 4; Pare, Forthcoming 3.
- 9)* *Buchheim, Kreis Tuttlingen, 'Wolfeggshof', tumulus 3, grave 1*: The two iron bits indicate harness for a pair of horses. Rich horse-gear: type 4. Zürn and Schick 1969, 20–21; pl. 15C, 1–3.6.
- 10) *Buchheim, Kreis Tuttlingen, 'Wolfeggshof'*: Rich horse-gear: type 5 (with ring-foot). See cat. no. 57B; Pl. 32D, 4.
- 11) *Eigeltingen-Honstetten, Kreis Konstanz, 'Frauenhau'*: Rich horse-gear: type 4. Wagner 1908, 10.
- 12)* *Engstingen-Großengstingen, Kreis Reutlingen, 'Weiler Haid'*: The two bronze bits in this tumulus indicate harness for a pair of horses. Rich horse-gear: types 1 and 4. Zürn 1987, 120; pl. 196A.
- 13) *Köngen, Kreis Esslingen*: Rich horse-gear: types 1, 4 (variant) and 8. See cat. no. 77.
- 14) *Neustetten-Wolfenhausen, Kreis Tübingen, 'Küblersloch', tumulus of 1876*: Rich horse-gear: type 4. Zürn 1987, 197; pl. 413B, 1–4.
- 15) *Oedheim, Kreis Heilbronn*: A fragmentary bronze bit came from this disturbed tumulus. Zürn 1987, 85; pl. 124F.
- 16) *Reichenau, Kreis Konstanz, tumulus B*: Rich horse-gear: type 4. See cat. no. 83.
- 17) *Rorgenwies, 'Hochbuck', from tumuli*: Rich horse-gear: type 4. Rest 1939.
- 18) *Sigmaringen-Laiz, Kreis Sigmaringen*: Rich horse-gear: type 4. Zürn 1987, 186; pl. 386, 4–6.
- 19) *Tannheim, Kreis Biberach, tumulus VI*: Rich horse-gear: type 4. Geyr and Goessler 1910, 33–4; Nestler-Wocher 1966. See cat. no. 93B.
- 20)* *Tannheim, Kreis Biberach, tumulus IX*: The two bronze bits indicate harness for a pair of horses. Rich horse-gear: types 1, 4 and 6 (with ring-foot). Geyr and Goessler 1910, 37–40; 37, fig. 18; pl. 12, 7; Nestler-Wocher 1966.
- 21)* *Tannheim, Kreis Biberach, tumulus XIII*: The two bronze bits indicate harness for a pair of horses. Rich horse-gear: types 1 and 4. Geyr and Goessler 1910, 44–5; 44, fig. 23; pl. 12, 8.9.12.13; Nestler-Wocher 1966.
- 22)* *Tannheim, Kreis Biberach, tumulus XVIII*: The two iron bits indicate harness for a pair of horses. Rich horse-gear:

types 4 and 10. Geyr and Goessler 1910, 52, fig. 26; pl. 12, 10; Nestler-Wocher 1966.

- 23) *Tannheim, Kreis Biberach, tumulus XXI*: Rich horse-gear: type 4. Geyr and Goessler 1910, 56; Nestler-Wocher 1966. See cat. no. 93E.
- 24) *Villingen-Schwenningen, Schwarzwald-Baar-Kreis, 'Magdalenenberg', grave I*: Rein-knobs with central point and broad flange (Figs 105, 3; 106, 2). Spindler 1971, pl. 2, 3–4.6–8. See cat. no. 96.
- 25)* *Wahlwies, Kreis Konstanz, tumulus I*: Iron fragments suggest the remains of one or two bits in this grave. Wagner 1908, 70–71; 69, fig. 49, w.

VII. BAVARIA

- 1)* *Aholting, Kreis Starnberg*: This tumulus grave contained remains of burnt bronze objects, including two fragments of bronze cheek-pieces. Rich horse-gear: type ?3 (bronze). Kossack 1959, 265; pl. 139, 6–7.
- 2)* *Altdorf, Kreis Nürnberger Land, tumulus I*: Only one iron bit was found in this grave, but it is quite possible that the harness fittings are incomplete owing to disturbance and later secondary graves. Rich horse-gear: type 10. Hoppe 1986, 124; pl. 31, 3–4.
- 3)* *Altdorf, Kreis Nürnberger Land, tumulus 3*: One iron bit was found in this tumulus, but without definite associated finds. Hoppe 1986, 125.
- 4) *Aubstadt, Kreis Königshofen*: Rein-knob with central hemispherical boss and narrow flange (Figs 102, 5–7; 103, 3). Hager and Mayer 1892, 61–2; pl. 6, 5; Kossack 1970, 114, fig. 12, 2–4.
- 5) *Augsburg-Wellenburg, Kreis Augsburg*: Rein-knobs with hemispherical boss and broad flange (Fig. 106, 7; Pl. 58B, 5–6). See cat. no. 103.
- 6) *Beilngries, 'Im Ried-West', Kreis Eichstätt, grave 74*: Rich horse-gear: types 3 (bronze), 6, 10, 14 and 15. Torbrügge 1965, 85–6; pls 30–31. See cat. no. 106B.
- 7)* *Beratzhausen, Kreis Regensburg, grave 1*: The two iron bits and three iron cheek-pieces from this grave indicate harness for a pair of horses. Rich horse-gear: types 6, 8 and 10. Torbrügge 1979, 286; pls 54; 55, 1–5.
- 8) *Beratzhausen, Kreis Regensburg, grave 3*: Rich horse-gear: types 5 and 8. Torbrügge 1979, 287; pls 56–57; 58, 1–10. See cat. no. 107B.
- 9)* *Dezenacker, Kreis Neuburg-Schrobenhausen, tumulus 2*: The two iron bits in this grave indicate harness for a pair of horses. Kossack 1959, 174.
- 10)* *Dietenhofen, Kreis Ansbach, tumulus A*: This tumulus contained iron fragments including an iron bit. Hoppe 1986, 98.
- 11)* *Eching, Kreis Fürstentfeldbruck*: An iron bit was found in tumulus 1 or 2. Kossack 1959, 196; pl. 120, 2.
- 12)* *Emmersdorf, Kreis Eggenfelden, excavation of 1905*: Among the finds from this excavation was an iron bit. Kossack 1959, 252; pl. 127, 14.
- 13)* *Emmerting-Bruck, Kreis Altötting, tumulus 16*: Among the finds from this tumulus were an iron sword and an iron bit; owing to the poor quality of the excavations it is impossible to judge if the grave originally contained further harness fittings. Kossack 1959, 189; pl. 119, 38.
- 14)* *Emmerting-Bruck, Kreis Altötting, tumulus 29*: The excavator only mentioned one bronze bit from this tumulus, along with associated finds. Rich horse-gear: types 1 and 4. Kossack 1959, 189; pl. 119, 36.44.45.

- 15)* *Emmerting-Gendorf, Kreis Altötting*: The bronze bit and tutulus-shaped rein-knob probably came from a tumulus grave. Rich horse-gear: type 6. Kossack 1959, 189; pl. 115, 2-3.
- 16)* *Fürstenfeldbruck, Kreis Fürstenfeldbruck*: This grave contained two bronze bits and six openwork bronze plaques which could be interpreted as *Jochschnallen*. The two bits indicate harness for a pair of horses. Rich horse-gear: type 1. Kossack 1959, 198; pl. 62, 4-10.
- 17)* *Gauting, Kreis Starnberg*: The two bronze bits from this grave indicate harness for a pair of horses. Rich horse-gear: type 4. Kossack 1959, 221; pl. 88, 3-5.
- 18)* *Götzendorf, Kreis Sulzbach-Rosenberg*: The two iron bits from this grave indicate harness for a pair of horses. Torbrügge 1979, 370-1; pl. 137, 9-10.
- 19) *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery I, grave 1*: Rich horse-gear: types 1, 4 and 14. Kossack 1970, 45-61; pls 38B; 39. See cat. no. 114A.
- 20)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery I, grave 2*: The two iron bits in this grave indicate harness for a pair of horses. Kossack 1970, pls 46-8.
- 21)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery I, grave 3*: The two iron bits in this grave indicate harness for a pair of horses. Kossack 1970, pls 52-4.
- 22) *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery I, grave 4*: Rein-knob with central hemispherical boss and narrow flange (Figs 102, 9-10; 103, 2). Kossack 1970, pl. 63, 9-11. See cat. no. 114B.
- 23)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery I, grave 5*: The two iron bits in this grave indicate harness for a pair of horses. Rich horse-gear: type 10. Kossack 1970, 84-91; pls 71-3.
- 24)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery I, grave 7*: The two iron bits in this grave indicate harness for a pair of horses. Kossack 1970, pls 79-81.
- 25) *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery II, grave 2*: Rein-knobs with hemispherical boss and broad flange (Fig. 106, 5). Unpublished, information kindly supplied by M. Schifferdecker. See cat. no. 115A.
- 26)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery II, grave 6*: The two iron bits in this grave indicate harness for a pair of horses. Unpublished, information kindly supplied by M. Schifferdecker, Würzburg.
- 27) *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery II, grave 14*: Rich horse-gear: type 5 (with ring-foot). See cat. no. 115C.
- 28)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery II, grave 17*: The two iron bits in this grave indicate harness for a pair of horses. Unpublished, information kindly supplied by M. Schifferdecker, Würzburg.
- 29)* *Großfeibstadt, Kreis Rhön-Grabfeld, cemetery II, grave 19*: The two iron bits in this grave indicate harness from a pair of horses. Unpublished, information kindly supplied by M. Schifferdecker, Würzburg.
- 30)* *Günching, Kreis Parsberg*: An iron bit, without associated finds, came to light in a group of tumuli. Torbrügge 1979, 302; pl. 67, 7.
- 31) *Illschwang-Gehrsricht, Kreis Amberg-Sulzbach, tumulus 2*: Rich horse-gear: types 5 (with ring-foot) and 10. Torbrügge 1979, 376; pl. 141, 6.13-17. See cat. no. 120.
- 32)* *Kirchenreinbach, Kreis Sulzbach-Rosenberg*: Three iron bits came to light in a group of tumuli. Torbrügge 1979, 380; pl. 149, 12-13.
- 33)* *Kissing, 'Lechfeld', Kreis Aichach-Friedberg*: Among the finds which could be rescued from a disturbed tumulus grave was a bronze bit. Schmitt 1985, 42f.; 43, fig. 8, 13.
- 34)* *Lager Lechfeld, Kreis Schwabmünchen, tumulus 13*: The two iron bits in this grave indicate harness for a pair of horses. Rich horse-gear: type 4. Kossack 1959, 185; pl. 59, 18-20 ('Graben'); Uenze 1971, 172; pl. 18, 1-2.4.5.
- 35) *Lager Lechfeld, Kreis Schwabmünchen, tumulus 14*: Rich horse-gear: type 4. Kossack 1959, 185.
- 36) *Leipheim, 'Waldteil Justing-West', Kreis Günzburg, tumulus 14*: Rich horse-gear: type ?4 - it is not certain whether this rein-knob is securely associated with the finds from the excavations of 1961. Kossack 1959, 155; pl. 35, 14. See cat. no. 125.
- 37)* *Maisach-Gernlinden, Kreis Fürstenfeldbruck*: This tumulus grave contained two iron bits and bronze fittings from a yoke (*Jochschnallen* and oval yoke terminals), deriving from the harness of a pair of draught horses. Rich horse-gear: types 4, 8, 11 and 14. Kossack 1959, 199; pl. 60.
- 38)* *Mindelheim, Kreis Mindelheim, tumulus 2*: The two iron bits indicate harness for a pair of horses. Rich horse-gear: type 4. Kossack 1959, 167; pl. 22, 1-2.6-10.
- 39)* *Mindelheim, Kreis Mindelheim, tumulus 7*: The two bronze bits indicate harness for a pair of horses; the rein-guides of type Leibnitz may have been fitted to a yoke. Rich horse-gear: types 1 and 9. Kossack 1959, 168; pl. 21.
- 40)* *Mindelheim, Kreis Mindelheim, tumulus 9*: The two bronze bits indicate harness for a pair of horses. Rich horse-gear: types 1 and 4. Kossack 1959, 169; pl. 23, 4-6.8.10.
- 41)* *Mindelheim, Kreis Mindelheim, tumulus 11*: The two iron bits and four bronze cheek-pieces indicate harness for a pair of horses; the rein-guides of type Leibnitz may have been fitted to a yoke. Rich horse-gear: types 3 (bronze) and 9. Kossack 1959, 169; pl. 25.
- 42)* *Mönchsdeggingen-Ziswingen, Kreis Donau-Ries*: The fragmentary bronze horse bit probably came from a grave. Anon. 1987, 116; 106, fig. 70, 5.
- 43)* *Moritzbrunn, Kreis Eichstätt*: This disturbed grave definitely contained a yoke. Rich horse-gear: types 4, 8, 10 and 14. Pare, Forthcoming 2.
- 44)* *Nennstingen-Wengen, Kreis Weißenburg-Gunzenhausen, tumulus 4*: Only one iron bit was found in this tumulus, and it is not certain to which of the inhumation burials it belonged, or whether it belonged to another disturbed grave. Hoppe 1986, 180; pl. 136, 6.
- 45) *Neukirchen-Gaisheim, Kreis Amberg-Sulzbach, tumulus 6*: Rich horse-gear: types 3 (iron), 4, 8 and 13. Torbrügge 1979, 383-5; pls 161-2. See cat. no. 129.
- 46)* *Niederambach, Kreis Fürstenfeldbruck, tumulus 3*: Only one iron bit was found in this tumulus; owing to the poor excavation, the grave ensemble is doubtless incomplete. Kossack 1959, 196; pl. 121, 2.
- 47)* *Oberfahlheim, Kreis Neu-Ulm*: The two bits (one of bronze the other of iron) indicate harness for a pair of horses. Rich horse-gear: types 1, 4 and 5 (with ring-foot or loop?). Kossack 1959, 182-3.
- 48)* *Obernicht, Kreis Beilngries, tumulus of 1965*: The two iron bits indicate harness for a pair of horses. The finds also included rein-knobs with hemispherical boss and broad flange (Fig. 106, 8). Pauli 1966, 75, fig. 5, 1-2.9-14.
- 49)* *Obernicht, Kreis Beilngries, tumulus of 1967*: According to Torbrügge, the grave contained two iron bits - which would indicate harness for a pair of horses. Torbrügge 1979, 247-9; 248, fig. 11, 7.
- 50)* *Ortlfing, Kreis Neuburg an der Donau, tumulus 1*: The yoke fittings from this grave indicate harness for a pair of draught horses. Rich horse-gear: type 11. Kossack 1959, 175.

- 51)* *Ortlfing, Kreis Neuburg an der Donau, tumulus 7*: The two iron bits indicate harness for a pair of horses. Kossack 1959, 175.
- 52) *Pilsting-Waibling, Kreis Dingolfing-Landau*: Rich horse-gear: type 10. Kreiner 1987, 118; 119, fig. 79, 4.
- 53)* *Pullach, Kreis München, 'Gruppe Nord', tumulus 1*: The two bronze bits indicate harness for a pair of horses. Kossack 1959, 214; pl. 79, 1-2.
- 54) *Pullach, Kreis München, 'Gruppe Süd', tumulus 3*: Rich horse-gear: types 1, 12 and 13 (variant). Kossack 1959, 214-5; pl. 80. See cat. no. 135.
- 55)* *Pullach, Kreis München, 'Gruppe Süd', tumulus 11*: The two iron bits indicate harness for a pair of horses. Kossack 1959, 215; pl. 85, 8-9.
- 56)* *Raitenbuch, Kreis Weißenburg-Gunzenhausen, tumulus 2*: This tumulus contained two iron bits, but it is uncertain from which grave or graves they came. Hoppe 1986, 184; pl. 149, 9-10.
- 56a)* *'Regensburg', stray find*: This bronze bit may come from an early grave of the Hallstatt period. Potratz 1966, 205, fig. 88, d.
- 57)* *Rehling-Au, Kreis Aichach, tumulus of 1898*: Among the numerous iron fragments from this grave are the remains of one or two bits. Kossack 1959, 187-8; pl. 51, 3-4.
- 57a) *Riedenburg-Deising, Kreis Kelheim, grave 2*: Among the harness fittings from this wagon-grave are bronze rein-knobs with hemispherical boss and broad flange (Fig. 106, 8a). Hoppe 1988, 38, fig. 1. See Addenda to the catalogue.
- 58)* *Riedenburg-Haidhof, Kreis Kelheim, grave VIII*: The iron bit fragments and yoke fittings clearly belong to harness for a pair of draught horses. Rich horse-gear: types 4 and 11. Engelhardt 1985, 110-112; 111, fig. 34.
- 59)* *Riegsee, Kreis Weilheim, tumulus 30*: An iron bit was found in this tumulus, without associated finds. Kossack 1959, 240.
- 60) *Scheuring-Haltenberg, Kreis Landsberg*: Rich horse-gear: type 4. Kossack 1959, 210; pl. 59, 21.
- 61)* *Schlipps, Kreis Freising*: One iron bit was found in this disturbed tumulus. Kossack 1959, 197.
- 62) *Schmidmühlen-Markhof, Kreis Amberg-Sulzbach, tumulus of 1887*: Rich horse-gear: types 8 and 10. Torbrügge 1979, 261-2; pl. 30, 1-6. See cat. no. 138.
- 63)* *Schöngeising, Kreis Fürstfeldbruck, 'Büchelwiese', tumulus 3*: The two iron bits indicate harness for a pair of horses. Kossack 1959, 200; pl. 62, 11-12.
- 64)* *Schöngeising, Kreis Fürstfeldbruck, 'Büchelwiese', tumulus 7*: The two iron bits indicate harness for a pair of horses. Kossack 1959, 200.
- 65)* *Schöngeising, Kreis Fürstfeldbruck, 'Brucklenich', tumulus 3*: The two iron bits indicate harness for a pair of horses. Kossack 1959, 200; pl. 62, 23-25.
- 66)* *Staatswald Mühlhardt, Kreis Fürstfeldbruck, tumulus 21*: This tumulus contained a fragmentary iron bit without any securely associated finds. Kossack 1959, 201.
- 67)* *Steinkirchen, Kreis Deggendorf*: This urn grave contained eight fragments of bronze cheek-pieces, which probably originally came from four complete pieces; there is also one complete bronze bit and a fragment of a second bit. The two bits and four cheek-pieces suggest harness for a pair of horses. Holste 1940, 9, fig. 2, 2.10-16.20-21.
- 68)* *Steppach, Kreis Wasserburg, tumulus of 1933-34*: The two iron bits indicate harness for a pair of horses. Kossack 1959, 231.
- 69)* *Thalmässing-Alfershausen, Kreis Roth*: The iron bit, three iron cheek-pieces and yoke fittings (two oval yoke terminals and six *Jochschnallen*) indicate harness for a pair of draught horses. Rich horse-gear: types 3 (iron), 5, 6, 10, 11 and 14. Hoppe 1986, 164-5; pls 107-109.
- 70)* *Thann-Neuhaus, Kreis Beilngries*: The two iron bits from this grave indicate harness for a pair of horses. Rich horse-gear: type 4. Torbrügge 1979, 253; pl. 18, 5-7.18-19.
- 71) *Tittmoning, Kreis Traunstein*: Rich horse-gear: type 9. Keller 1980, 119, fig. 14, 9.
- 72)* *Traunstein, Kreis Traunstein, 'Haidforst'*: The fragments of two iron bits and fragments of more than two cheek-pieces indicate harness for a pair of horses. Kossack 1959, 227-8; pl. 113, 1-5.
- 73)* *Unteresenacker, Kreis Parsberg, tumulus 1*: The two bronze bits indicate harness for a pair of horses. Rich horse-gear: types 1, 4, 8 and 10. Geupel 1975, 162; 163, fig. 1; Torbrügge 1979, 320; pl. 85, 6-8.10-11.
- 74)* *Unteresenacker, Kreis Parsberg, tumulus 2*: The two bronze bits indicate harness for a pair of horses. Rich horse-gear: types 1, 6, 8 and 10. Geupel 1975, 163-5; 164, fig. 2; Torbrügge 1979, 320; pl. 85, 1-4.
- 75)* *Unteresenacker, Kreis Parsberg, tumulus 4*: The two iron bits and four bronze cheek-pieces, the *Jochschnallen* and the oval yoke terminals indicate harness for a pair of draught horses. Rich horse-gear: types 3 (bronze), 10, 11, 12 and 13. Geupel 1975, 166-70; 167, fig. 4, c; 169, fig. 5, a; 170, fig. 6, c; Torbrügge 1979, 320-1; pls 88, 5; 89, 12.15.
- 76)* *Unteresenacker, Kreis Parsberg, tumulus 6*: The two iron bits and four bronze cheek-pieces indicate harness for a pair of horses. Rich horse-gear: types 3 (bronze), 5 and 10. Geupel 1975, 172-5; 170, fig. 6, d; 174, fig. 9, c-d; Torbrügge 1979, 321; pls 86, 8; 87, 6-7; 88, 1-4.
- 77)* *Velburg-Lengenfeld, Kreis Neumarkt in der Oberpfalz, tumulus 1 of 1894*: The two bronze bits and four bronze cheek-pieces indicate harness for a pair of horses. Torbrügge 1979, 307-8; pl. 70, 1-3.13-14.
- 78) *Velburg-Lengenfeld, Kreis Neumarkt in der Oberpfalz, tumulus of 1870*: Rich horse-gear: types 8 and 10. Torbrügge 1979, 308-9; pls 72, 14-15; 74, 14. See cat. no. 143.
- 79)* *Vöhringen, 'Illerberg', Kreis Neu-Ulm, tumulus 1*: This grave contained a yoke and two iron bits, indicating harness for a pair of draught horses. Rich horse-gear: types 4 and 14. Ambs and Pauli 1987, 86; 87, fig. 55.
- 80) *Waltenhausen, Kreis Günzburg, 'Hairenbuch', tumulus III*: Rein-knobs with central nipple and broad flange (Fig. 106, 6; Pl. 94, 8.12.13). See cat. no. 144.
- 81) *Wehringen, 'Hungerbrunnenmähder', Kreis Augsburg, tumulus 1*: Rich horse-gear: types 4 and 10. See cat. no. 146; Pl. 97B, 12.15.
- 82)* *Wienlbach, Kreis Wolfratshausen, 'Gruppe Vb', tumulus 11*: A fragmentary iron bit was found in this tumulus, but the grave finds are certainly not complete. Kossack 1959, 244; pl. 100, 3.

VIII. CENTRAL AND NORTH GERMANY

- 1)* *Bischofsheim, Hessen*: A fragmentary bronze bit was found in this grave; owing to the unprofessional excavation, in 1863, the grave ensemble cannot be regarded as being complete. Rich horse-gear: type 1. Kutsch 1926, 53, pl. 7, 94f.
- 2)* *Böcke, Kreis Brandenburg*: An iron bit came from this cemetery. Horst 1971, 194, fig. 1, f.

- 3) *Estorf-Leeseringen, Kreis Nienburg, grave 91*: Rich horse-gear: type 4. Tuitjer 1987, 122; pl. 19, 11.
 - 4) *Forst Merzelbach, near Römheld, Kreis Meiningen*: Rich horse-gear: type 4. Peschel 1971, 237, fig. 7, 18.
 - 5)* *Frankfurt-Stadtwald, 'Eichlehen', Hessen, tumulus 1, grave 12*: The two iron bits, four iron cheek-pieces and yoke clearly indicate harness for a pair of draught horses (Fig. 136). Rich horse-gear: types 2 (iron), 10 and 11. U. Fischer 1979, pls 12, 1–2.7; 33.
 - 6)* *Frauendorf, Kreis Cottbus, Brandenburg, grave 1*: This urn-grave contained a bent iron rod, probably a horse bit. Buck 1977, 35.
 - 7)* *Greibin, Kreis Parchim, Schwerin*: This urn grave contained two bronze bits, indicating harness for a pair of horses. Rich horse-gear: type 1. Lisch 1837, 158; pl. 33, 9; Beltz 1910, 254; pl. 43, 96; Sprockhoff 1936, 254; pl. 58, 12 (not from Karbow – ibid. 288).
 - 8)* *Kemnitz, Ostprignitz*: According to Wüstemann, this cemetery contained a grave with horse-gear, possibly the urn-grave with 'Glieder einer Bronzekette und neun Bronzetutuli' mentioned by Matthes. Matthes 1929, 173; Wüstemann 1974, 89, fig. 7.
 - 9)* *Liebethal, Ostprignitz*: This urn-grave contained a fragment of a bronze bit. Matthes 1929, 197.
 - 10)* *Marnitz, Mecklenburg*: Among the stray finds from a cemetery of urn-graves was a bronze bit. Rich horse-gear: type 1. Lisch 1837, 97–8.
 - 11)* *Rauschendorf, Kreis Ruppin, Brandenburg*: This urn-grave contained two iron bits, indicating harness for a pair of horses. Rich horse-gear: type 10. Kiekebusch 1928, 145; pl. 6; Horst 1971, 197, fig. 3, a–o.
 - 12)* *Vicinity of Römheld, Kreis Meiningen*: The pair of iron bits and the horse-gear presumably all came from one grave find; note also a rein-knob with central hemispherical boss and narrow flange (Fig. 103, 3a). Peschel 1971, 242, fig. 10.
 - 13)* *Seddin, Westprignitz*: One of the tumulus graves contained a rein-guide of type Leibnitz; this may have been fitted on a yoke and could indicate harness for draught horses. Rich horse-gear: type 9. Götze 1907, 39; 38, fig. 54.
 - 14)* *Seelow, Bezirk Frankfurt a. d. Oder, urn-grave 43c*: This grave contained one iron bit. Griesa 1982, 159; pl. 14, 1, 4.
 - 15)* *Triglitz, Ostprignitz*: The two iron bits and three bronze cheek-pieces indicate harness for a pair of horses. Rich horse-gear: type 2 (bronze). Matthes 1929, 267–70; Kossack 1954a, 156; 177, fig. 28B.
- IX. CZECHOSLOVAKIA
- 1) *Bechyně, okr. Tábor, tumulus 9*: Rein-knob with central hemispherical boss and narrow flange (Fig. 103, 15). Pič 1896, 6f.; pl. 2, 10.
 - 2)* *Biskupství, Moravia*: This cremation grave contained two iron bits, indicating harness for a pair of horses. Červinka 1902, 253; 254, fig. 122, 1.3.
 - 3)* *Bošovice, okr. Vyškov, Moravia, tumulus 9*: The two bronze bits from this grave indicate harness for a pair of horses. Rich horse-gear: type 1. Šolle 1955, 123, fig. 12, 7–8.
 - 4)* *Brno-Holásky, okr. Brno-město, tumulus 1*: This grave contained three iron bits. Rich horse-gear: types 5 and 10. Červinka 1948, 16; 15, fig. 8, 3–6.16.17.
 - 5)* *Brno-Holásky, okr. Brno-město, tumulus 2*: This grave contained three iron bits; the position of the bits on the grave plan suggests harness for a pair of (draught) horses and for a third (ridden) horse. Červinka 1948, 16–17; 17, fig. 9; 18, fig. 10, 3.5.8.
 - 6)* *Brno-Obřany, Moravia, grave 169*: The bent iron object from this grave could be interpreted as a cheek-piece. Stegmann-Rajtar 1986, 444, pl. 2, 3.
 - 7)* *Budyně nad Ohří, okr. Litoměřice, grave of 1906*: The bronze ring with four pendent chains probably belonged to a yoke, indicating the presence of harness for paired draught horses in this grave (compare for example Hradenín graves 24, 46 and 58; Ohrada [Pl. 126A, 6]; Igersheim-Simmring [Pl. 39A, 3] etc.). The finds also include a rein-knob with central hemispherical boss and narrow flange (Fig. 103, 10). Pič 1908, pl. 17, 2.7; Zápotocký 1964, 157; 158, fig. 2, 22–29; Kossack 1970, 114, fig. 12, 1.
 - 8)* *Budyně nad Ohří, okr. Litoměřice, grave of 1944*: The two iron bits in this grave indicate harness for a pair of horses. Rich horse-gear: types 5 (with ring-foot), 8 and 10. Zápotocký 1964, 157–8; 159, fig. 3, 1–6.29.31.32.
 - 9) *Býč-skála cave, okr. Blansko, Moravia*: Rich horse-gear: type 5. Drescher 1980, 54, figure.
 - 10)* *Bylany, okr. Kolín, grave 1 of 1895–96*: The two bits in this grave (one bronze and one iron) indicate harness for a pair of horses. Pič 1897, 382–3; pl. 42, 7.
 - 11)* *Bylany, okr. Kolín, grave 18 of 1895–96*: The two iron bits in this grave indicate harness for a pair of horses. Pič 1897, 390–2; 392, figure; pl. 42, 17.
 - 12)* *Bylany, okr. Kolín, grave 34 of 1895–96*: The two iron bits in this grave indicate harness for a pair of horses. Rich horse-gear: type 6. Pič 1897, 397; pl. 43, 6.
 - 13)* *Bylany, okr. Kolín, stray finds from the excavations of 1897*: Pič illustrates an iron bit from this cemetery without mentioning it in his text; it must be regarded as a stray find. Likewise the 'tutulus'-shaped rein-knob (Rich horse-gear: type 5). Pič 1898a, pl. 23, 18.23.
 - 14)* *Bylany, okr. Kolín, grave 2 of 1897*: The two iron bits in this grave indicate harness for a pair of horses. Rich horse-gear: type 10. Pič 1898a, 217–9; pl. 23, 15.
 - 15)* *Bylany, okr. Kolín, grave 3 of 1897*: The two iron bits in this grave indicate harness for a pair of horses. Pič 1898a, 219.
 - 16)* *Bylany, okr. Kolín, grave 4 of 1897*: This grave contained a single iron bit. Pič 1898a, 220.
 - 17)* *Bylany, okr. Kolín, grave 9 of 1897*: The two iron bits in this grave indicate harness for a pair of horses. Pič 1898a, 222–3.
 - 18)* *Bylany, okr. Kolín, grave 11 of 1897*: This grave was disturbed; only one iron bit was discovered, having been brought up to the soil surface by the plough. Pič 1898a, 223.
 - 19)* *Bylany, okr. Kolín, grave 12 of 1897*: The two iron bits in this grave indicate harness for a pair of horses. Pič 1898a, 223–4.
 - 20)* *Dýšina, okr. Plzeň-sever*: A bronze bit probably came from one of the rich tumulus graves in this area. Rich horse-gear: type 1. Šaldová 1968, 351, fig. 26, 2.
 - 21) *Dýšina, okr. Plzeň-sever, grave 2*: Rich horse-gear: types 4, 10, 11, 12 and 14. Šaldová 1968, 345, fig. 23; 347, fig. 24. See cat. no. 150.
 - 22)* *Horákov, okr. Brno-venkov, 'Hlásnice'*: This tumulus contained five fragmentary iron bits; considering the presence of both cremation and inhumation burials, and the number of grave finds, it seems likely that the tumulus contained more than one horse-gear grave. Rich horse-gear: types 4, 5 (variant, with ring-foot) and 8. Skutil 1937; Podborský 1974, 399, fig. 11, 11–14.22–26.

- 23)* *Hradenín, okr. Kolín, grave 1*: This grave contained two iron bits indicating harness for a pair of horses. Dvořák 1935, 75–77; 76, fig. 2; pl. 1, 16–17.
- 24)* *Hradenín, okr. Kolín, grave 3*: The two iron bits in this grave indicate harness for a pair of horses. Dvořák 1935, 77–78; 79, fig. 3, III.
- 25) *Hradenín, okr. Kolín, grave 5*: Rein-knobs with hemispherical boss and broad flange (Fig. 106, 12). Dvořák 1935, pl. 2, 17.19.20. See cat. no. 151B.
- 26)* *Hradenín, okr. Kolín, grave 12*: This grave contained three iron bits; the position of the bits on the grave plan suggests harness for a pair of (draught) horses and for a third (ridden) horse. Dvořák 1938a, 61–64; 60, fig. 1, XII; pl. 5, 1–3.
- 27)* *Hradenín, okr. Kolín, grave 14*: This grave contained three iron bits; the position of the bits on the grave plan, and the fact that whereas two bits were of the same type, the third bit was different (with a rein-hook), suggests harness for a pair of (draught) horses and a third (ridden) horse. Rich horse-gear: type 10. The finds also include a rein-knob with central hemispherical boss and narrow flange (Fig. 103, 13). Dvořák 1938a, 65–68; 60, fig. 1, XIV; 62, fig. 3, 1–5.9–10.
- 28) *Hradenín, okr. Kolín, grave 18*: Rein-knobs with hemispherical boss and broad flange (Fig. 106, 12). Dvořák 1938a, 64, fig. 5, 11. See cat. no. 151C.
- 29)* *Hradenín, okr. Kolín, grave 20*: This grave contained three iron bits. Dvořák 1938a, 72–74; 60, fig. 1, XX.
- 30) *Hradenín, okr. Kolín, grave 24*: Rich horse-gear: types 3 (bronze), 5 (with ring-foot), 7, 10 and 11. Dvořák 1938b, 28, fig. 26. See cat. no. 151D.
- 31) *Hradenín, okr. Kolín, grave 28*: Rein-knobs with hemispherical boss and broad flange (Fig. 106, 12). Dvořák 1938a, 82, fig. 22, 13–14. See cat. no. 151E.
- 32) *Hradenín, okr. Kolín, grave 46*: Rich horse-gear: types 3 (bronze), 5 (with ring-foot), 7, 10, 11 and 15. Dvořák 1938b, 49, fig. 44; 50, fig. 45. See cat. no. 151I.
- 33)* *Klášteří-Skalice (Žárýbník), okr. Kolín*: This grave contained two iron bits indicating harness for a pair of horses. Pič 1897, 399–401; pl. 49, 3–4.
- 34)* *Kolaje-Račany, okr. Nymburk, grave 1 of 1902–3*: This grave contained two iron bits indicating harness for a pair of horses. Sedláčková 1973, 129–131; 131, fig. 2; 132, fig. 3, 1.
- 35)* *Kolaje-Račany, okr. Nymburk, grave 3 of 1903*: This grave contained two iron bits indicating harness for a pair of horses. Sedláčková 1973, 131–3; 133, fig. 4, 1; 134, fig. 6.
- 36)* *Kolaje-Račany, okr. Nymburk*: A bronze bit, without associated finds, apparently came from a grave of the Bylany culture. Rich horse-gear: type 1. Sedláčková 1973, 136; 136, fig. 8.
- 37)* *Kolín, okr. Kolín, 'Kašparides', grave 6*: This grave contained two iron bits indicating harness for a pair of horses. Koutecký 1968, 418; 427, fig. 14.
- 38) *Kyšice, okr. Plzeň-sever, tumulus 1*: Rein-knob with central hemispherical boss and narrow flange (Fig. 103, 11). Šaldová 1968, 349, fig. 25, 10.
- 39) *Kyšice, okr. Plzeň-sever, find of 1905*: Rich horse-gear: type 5. Šaldová 1968, 349, fig. 25, 11.13.20–23.
- 40) *Lhotka, okr. Ústí nad Labem*: Rich horse-gear: types 1, 4, 5 (with ring-foot), 10, 11 and 14. See cat. no. 153; Pls 116B, 13–14.26; 118, 7–8.11–13.16–17.
- 41) *Lipno, okr. Louny, from a destroyed grave*: Rich horse-gear: type 10; also a rein-knob with central hemispherical boss and narrow flange (Fig. 103, 5). Koutecký and Michálek 1978, 255, fig. 3, 15870.15872.15884.
- 42)* *Litoměřice-jih, 'Weigendova pískovna', inhumation grave 1*: This grave contained one bronze bit. Kern 1932, 504–28; 506, fig. 1; Zápotocký 1964, 162–4; 164, fig. 7, 1.
- 43)* *Lovosice, okr. Litoměřice, 'Schwarzenberská cihelna', grave of 1928*: This grave contained two iron bits indicating harness for a pair of horses. Rich horse-gear: types 5 (with ring-foot) and 10. Zápotocký 1964, 166; 168, fig. 10.
- 44)* *Lovosice, okr. Litoměřice, grave II of 1956*: The two iron bits and four bronze cheek-pieces in this grave indicate harness for a pair of horses. Rich horse-gear: types 3 (bronze), 5, 7, 8 and 10. Pleiner 1959, 655; 657, fig. 247; 670, fig. 255.
- 45)* *Lovosice, okr. Litoměřice, grave III of 1956*: The two iron bits and yoke fittings from this grave indicate harness for a pair of draught horses. Rich horse-gear: types 4, 5 (with ring-foot), 10 and 14. Pleiner 1959, 655–6; 672, fig. 257; Filip 1966, 177, fig. 14; 178, fig. 15.
- 46)* *Manětín-Hrádek, okr. Plzeň-sever, grave 188*: The two iron bits in this grave indicate harness for a pair of horses. Soudská 1981, 170, fig. 1, a.
- 47) *Miškovice, okr. Kolín*: Rein-knob with central hemispherical boss and narrow flange (Fig. 103, 14). See cat. no. 155; Fig. 102, 8; Pl. 119B, 12.14.
- 48) *Morašice, okr. Moravský Krumlov, Moravia*: Rich horse-gear: types 5, 6 and 8. Podborský 1974, 401, fig. 12; Říhovský 1956, 15, fig. 4; Podborský and Vildomec 1972, 115, fig. 31.
- 49) *Nehvizdky, okr. Praha-východ, grave 1*: Rein-knob with central hemispherical boss and narrow flange (Figs 102, 1–2; 103, 12). Koutecký and Špaček 1982, 69, fig. 12. See cat. no. 156A.
- 50) *Nymburk-Habeš, okr. Nymburk*: Rein-knob with central point and broad flange (Fig. 106, 11; Pl. 120, 2). See cat. no. 157.
- 51)* *Plaňany, okr. Kolín, grave 5*: The two iron bits, four iron cheek-pieces and yoke indicate harness for a pair of draught horses; the third iron bit, without cheek-pieces, indicates harness for a third (ridden) horse (Fig. 137). Rich horse-gear: types 3 (iron), 4, 6, 10 and 11. Dvořák 1933.
- 52)* *Platěnice, okr. Pardubice, 'Daněk', grave 20*: This grave contained a fragment of a bronze bit and two bronze cheek-pieces. Rich horse-gear: type 3 (bronze). Pič 1903, 482–3; pl. 53, 4–5; Hralová 1965, 134–6; 135, fig. 2, 2–3.
- 53)* *Platěnice, okr. Pardubice, 'Daněk', grave 32*: This grave contained a single iron bit and two iron cheek-pieces. Rich horse-gear: type 3 (iron). Pič 1903, 484; pl. 53, 14.
- 54)* *Platěnice, okr. Pardubice, 'Pravda', grave 52*: This grave contained a single iron bit and two iron cheek-pieces. Rich horse-gear: type 3 (iron). Pič 1903, 494; pl. 56, 1.
- 55)* *Platěnice, okr. Pardubice*: Among the stray finds from this cemetery are one iron and two bronze bits. Pič 1907b, pl. 33, 2.4.6.
- 56)* *Posádka, okr. Trnava, Slovakia*: This inhumation grave contained a pair of bronze cheek-pieces of Kossack's type III. Dušek 1961, 66; 65, fig. 4, 12–13.
- 57)* *Praha-Střešovice, 'Hubálka'*: Among the finds from this grave was a single iron bit; the finds were brought to the museum by a worker and presumably do not represent a complete grave ensemble. Axamit and Schráníl 1915, 86–90; pl. 9, 4.
- 58)* *Praha-Střešovice, grave 11*: This grave contained two iron bits indicating harness for a pair of horses. Rich horse-

- gear: type 5. Böhm 1931, 67–70; fig. 47, 2–11.
- 59)* *Předmětice, okr. Hradec Králové*: This grave contained one bronze bit and two bronze cheek-pieces. Werner 1961, 385, fig. 1, 4–5.
- 60)* *Protivín, okr. Písek, tumulus 2*: This grave contained two iron bits indicating harness for a pair of horses. Beneš 1972, 288; Michálek 1990, 67, fig. 23.
- 61)* *Řepeč, okr. Tábor, 'les Atlas', tumulus 7*: This grave contained two iron bits indicating harness for a pair of horses. Pič 1898b, 3–4; pl. 4, 5; Michálek 1990, 68, fig. 24.
- 62) *Rvenice, okr. Louny, grave 1 of 1963*: Rein-knobs with central hemispherical boss and narrow flange (Fig. 103, 8). Unpublished. See cat. no. 165.
- 63)* *Rvenice, okr. Louny, grave of 1966*: This grave contained two iron bits indicating harness for a pair of horses; note also rein-knobs with central hemispherical boss and narrow flange (Figs 102, 3–4; 103, 9). Pleinerová 1973, 274–81; 278, fig. 4, 2–3; 279, fig. 5, 1–10.
- 64)* *Rybníky, okr. Žnojmo, Moravia*: Among a collection of stray finds from Rybníky is a fragmentary iron bit; it probably came from a grave. Unpublished, information kindly supplied by J. Nekvasil.
- 65)* *Santovka, okr. Levice (Fig. 139)*: This group of bronzes was found in 1924. Owing to the composition of the find (one bit, two cheek-pieces, two rein-knobs, one knife, one socketed axe) it seems likely that it should be interpreted as a grave rather than a hoard. Nevizánsky 1985, 603, fig. 1.
- 66)* *Sedlice, okr. Blatná, 'small tumulus'*: Among the finds from this tumulus was an iron bit. Šaldová 1957, 686.
- 67)* *Seloutky, okr. Prostějov, Moravia, grave 2*: This grave contained three iron bits; three linked iron rings attached to a looped iron nail could come from a yoke. The finds also included rein-knobs with central hemispherical boss and narrow flange (Fig. 103, 17). Gottwald 1928, 11–12; pl. 3, 10.12.24.32; Gottwald 1931, 146, pl. 28, 28–29; Říhový 1979, pl. 83E, 10.
- 68)* *Senica, Slovakia*: This grave contained a pair of bronze cheek-pieces, presumably harness for a single horse. Nevizánsky 1985, pl. 1.
- 69)* *Skršín, okr. Most*: This grave contained three iron bits; also rein-knobs with central hemispherical boss and narrow flange (Fig. 103, 6). Koutecký 1968, 426; unpublished report in the Archeologický Ústav ČSAV, Prague (AÚ č. 428/52).
- 70) *Solany, okr. Litoměřice*: Rein-knobs with central hemispherical boss and narrow flange (Figs 102, 11; 103, 7). Zápotocký 1964, 170; 158, fig. 2, 1–13; Kossack 1970, 114, fig. 12, 13–14.
- 71) *Straškov-Račíněves, okr. Litoměřice, grave of 1911*: Rich horse-gear: types 4 and 5 (with ring-foot). Dvořák 1938b, 20, fig. 17, 2–3.9–10.15–23. See cat. no. 168A.
- 72) *Straškov-Račíněves, okr. Litoměřice, excavations of 1913*: Rich horse-gear: type 1. Dvořák 1938b, 20, fig. 17, 14.
- 73)* *Střelské Hoštice, okr. Horažďovice*: A rich tumulus grave from this locality contained three iron bits, two bronze vessels, two bronze barrel-shaped arm-bands etc. Ludíkar 1877, 13–18; 16, fig. 4; Šaldová 1957, 687–8.
- 74) *Stupešice, okr. Žnojmo, from a settlement*: Rich horse-gear: type 1. Podborský 1970a, 91, fig. 37, 27.
- 75)* *Těšetice, okr. Žnojmo, Moravia, grave 1*: This grave was badly disturbed by ploughing, and only one iron bit survived from the horse-gear. Košťurík and Palátová 1984, 122–7; 125, fig. 13.
- 76) *Třebeň, okr. Litoměřice*: Rich horse-gear: type 5 (with ring-foot). Zápotocký 1964, 158, fig. 2, 20.
- 77) *Třtěno, okr. Louny*: Rein-knob with central point and broad flange (Fig. 106, 10). Zápotocký 1964, 158, fig. 2, 18.
- 78) *Tuchoměřice, okr. Praha-západ*: Rich horse-gear: type 1. Koutecký 1983, 245, fig. 3, 1. See cat. no. 170.
- 79) *Týn nad Vltavou, okr. České Budějovice*: Rich horse-gear: type 8. Unpublished (museum Týn nad Vltavou).
- 80)* *Velešice, okr. Jičín*: This sword-grave contained a fragmentary bronze bit. Domečka 1923, 339, footnote 2 ('na pozemku Turnovského pod Vysočany u Nov. Bydžova...'); Filip 1937, 95, fig. 50, 7; 99, fig. 53, 3 (= 'Chudonice'); Novák 1975, 30, no. 184.
- 81) *Vikletice, okr. Chomutov, grave 138 of 1963–4*: Rein-knobs with central hemispherical boss and narrow flange (Fig. 103, 4). Unpublished. See cat. no. 171B.
- 82)* *Žáboří, okr. Kutná Hora*: This tumulus grave was destroyed, but two bronze bits and two bronze cheek-pieces could be saved from the horse-gear. Smolík 1881, 664–5; pl. 28, 15–17.
- 83) *Žleby (formerly Ksiny), okr. Kutná Hora*: Rich horse-gear: type 5. Unpublished (museum Čáslav, inv. nos 1820–1842), see Koutecký 1968, 429–30.

X. POLAND

- 1)* *Bystrzyca (formerly Peisterwitz), pow. Olawa, grave 1*: This grave definitely contained a single iron bit. Seger 1902, 26; 27, fig. 17.
- 2)* *Bystrzyca (formerly Peisterwitz), pow. Olawa, grave 2*: This grave contained eight iron fragments which probably came from a single iron bit. Seger 1902, 26; 27, figs 15–16.18–23.
- 3)* *Bystrzyca (formerly Peisterwitz), pow. Olawa, grave 6*: Six iron fragments probably came from an iron bit or bits. Seger 1902, 28; 29, fig. 35.
- 4)* *Chartupia-Mała, gm. Sieradz, woj. Sieradz*: This grave contained a single iron bit. Kruszyński 1986.
- 5)* *Dobra (formerly Karlsburg), pow. Oleśnica*: This cremation grave contained two iron bits indicating harness for a pair of horses. Rich horse-gear: types 6 and ?10. Petersen 1930, 197–8.
- 6)* *Doliwiec, gm. Zaniemyśl, woj. Poznań*: This grave contained a single iron bit. Jamka 1937, 19; Kruszyński 1986.
- 7)* *Gluszyń (formerly Glausche), pow. Namysłów*: An iron bit, without associated finds, came from this cemetery of urn-graves. Ebert 1927, pl. 87, y.
- 8) *Gorszewice, pow. Szamotuły, grave 48*: Rich horse-gear: type 10. Pieczyński 1953, 121, fig. 32, 3.
- 9)* *Gorszewice, pow. Szamotuły, grave 55*: The two iron bits in this grave indicate harness for a pair of horses. Pieczyński 1953, 122; 123, fig. 37, 3.8.
- 10) *Gorszewice, pow. Szamotuły, stray finds*: Rich horse-gear: type 5. Pieczyński 1953, 136, fig. 48, 13.
- 11)* *Jankowy, gm. Baranów, woj. Kalisz*: An iron bit was found in this cemetery. Durczewski 1948, 246–8; pl. 64, 14.
- 12)* *Kalinów, pow. Strzelce Opolskie*: This grave contained a single iron bit. Kruszyński 1986.
- 13) *Kamieniec, pow. Toruń, settlement*: Rich horse-gear: types 5 (with ring-foot) and 6. Zielenka 1955, pls 22, 23–24; 24, 39.
- 14) *Kielpino, pow. Kolubrzeg (formerly Kölpin, Kreis Kolberg-*

- Körlin*), hoard: Rich horse-gear: type 5 (with ring-foot). Anon. 1885b, 394–401; pl. 5. See Fig. 130.
- 15)* *Kilianów (formerly Landau), pow. Wrocław, grave 2*: This grave contained a single iron bit. Glaser 1937, 81–2.
- 16)* *Kuniów, pow. Kluczbork, grave 9*: This rich grave contained a single iron bit. Rich horse-gear: type 5. Gedl 1962, 250–1; pl. 19, 5–6.8–15.
- 17)* *Lupice, gm. Pyzdry, woj. Konin*: This grave contained a single iron bit. Kruszyński 1986.
- 18)* *Nadziejewo, pow. Średzki*: An iron bit, without associated finds, came from this cemetery. Koehler 1900, pl. 34, 9; Kostrzewski 1923, 105, fig. 359; 317, no. 359.
- 19)* *Paulinów (Szkućla), gm. Gołuchów, woj. Kalisz*: This grave contained a single iron bit. Kruszyński 1986.
- 20)* *Piwnice, gm. Kalisz, woj. Kalisz*: This grave contained a single iron bit. Jamka 1937, 19; Kruszyński 1986.
- 21)* *Popielów, pow. Opole*: This grave contained a single iron bit. Kruszyński 1986.
- 22)* *Rolantowice, pow. Wrocław*: This grave contained a single iron bit. Kruszyński 1986.
- 23)* *Skrajna, pow. Kalisz, grave 8*: This grave contained a single iron bit. Jamka 1937, 7–9; 9, fig. 21, g.
- 24)* *Skrajna, pow. Kalisz, grave 10*: This grave contained a single iron bit. Jamka 1937, 11–12; 12, fig. 28, f.
- 25)* *Sokolniki, gm. Gorzyce, woj. Tarnobrzeg*: An iron bit, without associated finds, came to light in this cemetery. Piaskowski 1969, 203, fig. 29; Moskwa 1976, 288–90; 289, fig. 61, r.
- 26) *Solniki Małe (formerly Klein-Zöllnig), pow. Oleśnica, Silesia, hoard*: Rich horse-gear: types 6 (with ring-foot) and 7. Grempler 1904, 43, figs 2–5.
- 27) *Stęszewo (formerly Hanshagen), gm. Ustronie Morskie, pow. Kolobrzeg, hoard*: Rich horse-gear: type 3 (bronze). Schumann 1898, 18, figs 8–9.
- 28)* *Teklin, pow. Otwock*: An iron bit came to light in this cemetery. Węgrzynowicz 1966, 506, fig. 2.
- 29)* *Trzcina Wołowska, gm. Wińsko, woj. Wrocław*: A single iron bit was found in this grave. Kruszyński 1986.
- 30)* *Tupadły, gm. Inowrocław, woj. Bydgoszcz*: A single iron bit came to light in this cemetery. Kruszyński 1986.
- 31)* *Warszawa-Henryków, grave 82/83*: This double grave contained a single iron bit. Zawadzka 1964, 252; pl. 11, 7.
- 32) *Woskowice Małe (formerly Lorzendorf), pow. Namysłów*: Rein-knobs with central nipple and broad flange (Figs 105, 2; 106, 13). Grempler 1899, 197, fig. 4; Ebert 1926, pl. 208, h.i.
- 33)* *Wrocław – Ksieje Wielkie (formerly Breslau-Groß Tschansch), woj. Wrocław, grave 172*: This grave contained a single iron bit. Glaser 1937, 69–70; pl. 8, 6.
- 34)* *Żaborowo, pow. Wolsztyński*: This urn-grave contained a single bronze bit. Virchow 1875, (154)–(159); pl. 11, 6.
- bit and two bronze cheek-pieces. Angeli 1980, 190; Tomedi 1989, 61ff.
- 5)* *Frög, Kärnten, tumulus 1 (Parzelle 1499)*: This tumulus apparently contained one iron bit and two iron cheek-pieces. Rich horse-gear: type ?3 (iron). Modrijan 1957, 29; 9, fig. 2, 33.
- 6)* *Gilgenberg, 'Gansfuß', Oberösterreich, tumulus 1*: The excavators found one iron bit in this tumulus. Reitingner 1968, 107.
- 7)* *Gilgenberg, 'Gansfuß', Oberösterreich, tumulus 2*: This tumulus apparently contained one iron bit and one bronze cheek-piece. Rich horse-gear: types 2 (bronze) and 4. Kossack 1954a, 155; 177, fig. 28A; Reitingner 1968, 107.
- 8)* *Gilgenberg, 'Gansfuß', Oberösterreich, tumulus 3*: This tumulus contained two iron bits indicating harness for a pair of horses. Rich horse-gear: types 4 and 8. Kossack 1954a, 155; 178, fig. 29F; Reitingner 1968, 107.
- 9)* *Gilgenberg, 'Gansfuß', Oberösterreich, tumulus 8*: The excavation uncovered one iron bit. Rich horse-gear: type 5 (variant, with ring-foot). Von Preen 1889, 83–6; pl. 9, 1a–d; Reitingner 1968, 107.
- 6–9)* *Gilgenberg*: According to the research of T. Stöllner (Marburg) on the unpublished finds from Gilgenberg, the cemetery contained a fourth grave with one bit, a second grave with two bits and, in addition, one grave with three horse bits.
- 10) *Hallstatt, Oberösterreich, grave 131*: Rich horse-gear: type 10. Kromer 1959, pl. 13, 12.
- 11)* *Hallstatt, Oberösterreich, grave 196*: This grave contained one bronze bit, but note that it was found on the chest of a female inhumation and was used as a pendent amulet. Rich horse-gear: type 1. Kromer 1959, pl. 22, 12.
- 12) *Hallstatt, Oberösterreich, grave 393*: Rich horse-gear: type 4. Kromer 1959, pl. 61, 9.
- 13) *Hallstatt, Oberösterreich, grave 457*: Rich horse-gear: type 10. Kromer 1959, pl. 73, 14.
- 14) *Hallstatt, Oberösterreich, grave 784*: Rich horse-gear: type 4. Kromer 1959, pl. 156, 7.10.
- 15) *Hallstatt, Oberösterreich, grave 888*: Rich horse-gear: types 5 and 5 (with ring-foot). Kromer 1959, pl. 181, 1.3.
- 16) *Hallstatt, Oberösterreich, grave 33/Linz*: Rich horse-gear: type 4. Kromer 1959, pl. 235, 12–13.
- 17)* *Kleinklein, Steiermark, 'Pommerkogel'*: The two iron bits indicate harness for a pair of horses. Schmid 1933, 228.
- 18)* *Kleinklein, Steiermark, 'Kroll-Schmidkogel'*: A bronze bit was recently uncovered by the plough in the vicinity of this tumulus. Unpublished, information from C. Dobiat.
- 19) *Kleinklein, Steiermark, 'Tschoneggerfranzl', tumulus 2*: Rich horse-gear: type 10. Dobiat 1980, pl. 58, 29.
- 19a)* *Kleinklein, Steiermark, Hartnermichel tumulus*: This rich tumulus grave contained at least one elaborate bronze bit. Rich horse-gear: type 1. According to Chantre, the bit illustrated by Gallus and Horváth comes from Kleinklein – presumably from the Hartnermichelkogel which has one of the characteristic rein ornaments (published by Dobiat). Chantre 1886, 88, fig. 89; Gallus and Horváth 1939, pl. 50, 1; Dobiat 1980, pl. A1, 11.
- 20)* *Leibnitz (Flavia Solvia), Steiermark*: Among the stray finds from this tumulus cemetery are two rein-guide rings of type Leibnitz and an iron bit; the rein-guides of type Leibnitz may have been fitted to a yoke and could indicate harness for draught horses. Rich horse-gear: type 9. Kossack 1953, 51, fig. 1.
- 21)* *Maiersch, Niederösterreich, grave 36*: This grave contained one iron bit. Berg 1962, pl. 12, 2.

XI. AUSTRIA

- 22)* *Maiersch, Niederösterreich, grave 50*: This grave contained one iron bit. Berg 1962, pl. 18, 4.
- 23)* *Mattsee-Buchberg, Salzburg, tumulus I, V or VI*: Fragmentary remains of two iron bits were found in these three tumuli. Weißenborn 1982, 27–8; pl. 28B.
- 24)* *Mitterkirchen, Oberösterreich, tumulus I, grave 3*: This grave contained two iron bits, indicating harness for a pair of horses. Rich horse-gear: type 10. Pertlwieser 1982, 14; *ibid.* 1983, 38, nos 22–23; 56, fig. 5.
- 25)* *Mitterkirchen, Oberösterreich, tumulus I, grave 8*: This grave contained one iron bit. Pertlwieser 1982, 20.
- 26) *Mitterkirchen, Oberösterreich, tumulus X, grave 1*: Rich horse-gear: types 11 and 14. Pertlwieser 1987, 51, figs 7–8. See cat. no. 178B.
- 27)* *Pfaffstätt-Siedelberg, Oberösterreich, tumulus I*: This grave contained two iron bits, indicating harness for a pair of horses. Egg 1985b, 267–9.
- 28)* *Retz, Niederösterreich, grave 2 of 1889*: This flat grave contained a single iron bit. Rich horse-gear: type 5. Kossack 1954a, 161; Drescher 1956, 89, fig. 2; Kaus 1973, 177–181. A bronze bit with rein-rings is also known from Retz. Rich horse-gear: type 1. L. Franz, in: *Mitteilungen der Anthropologischen Gesellschaft in Wien*, 57, 1927, 204, fig. 4, bottom; Maurer 1989, 50, fig. 19.
- 29)* *Roggendorf, BH Horn*: An iron bit came from one of the graves (graves 1–8) in this cemetery, also rein-knobs with central hemispherical boss and narrow flange (Fig. 103, 16). Unpublished; information kindly supplied by L. Nebelsick.
- 30)* *Schleedorf, Salzburg, tumulus IV*: Two iron bits indicate harness for a pair of horses. Weißenborn 1982, 69–72.
- 31)* *Statzendorf, Niederösterreich, grave 27*: This grave contained two iron bits, indicating harness for a pair of horses. Dungal 1931, 21–2; 22, fig. 93.
- 32)* *Stillfried, Niederösterreich, grave of 1895*: This cremation grave contained a pair of bronze bits and, presumably belonging with them, four bronze cheek-pieces, indicating harness for a pair of (draught) horses. The two rein-guide rings could come from the harness of the draught horses. Furthermore the grave contained another bronze bit and a bronze cheek-piece, indicating a third (ridden) horse. Mayer 1977, cat. no. 812; pl. 127B.
- 33)* *Stillfried, Niederösterreich, grave 6 of 1975–7*: This grave contained two different bronze bits, fragments of two cheek-pieces of Kossack's type II and a single cheek-piece of Kossack's type Ia. This probably represents only a part of the original set of harnessing, the rest falling prey to the cremation pyre. Kaus 1984, 76–83; pl. 9, j.l.m.o.p.
- 34)* *Stillfried, Niederösterreich, grave 38 of 1975–7*: This grave contained a single bronze bit. Kaus 1984, 157–63; pl. 37, a.
- 35)* *Stillfried, Niederösterreich, Much'sches Gräberfeld*: Among the stray finds from this cemetery are a bronze bit and a cheek-piece of Kossack's type II. Strohschneider 1976, pl. 8, 20.29.
- 36)* *Strettweg, Steiermark*: According to M. Egg this grave probably contained two iron horse bits. Rich horse-gear: types ?9 and 10 – the ring attachment of type Leibnitz is identical with the Leibnitz example, likewise in the Graz museum, and may originally have come from the latter cemetery. Kossack 1953, 51, fig. 1; Schmid 1934, pl. 6, 4; Egg (Forthcoming 2). See cat. no. 180.
- 37)* *Wörgl, Tirol, grave 5*: This grave contained two iron bits and four iron cheek-pieces, indicating harness for a pair of horses. Rich horse-gear: types 3 (iron) and 4. Unpublished.
- 38)* *Wörgl, Tirol, grave 51*: This grave contained two iron bits, indicating harness for a pair of horses; also rein-knobs with hemispherical boss and broad flange (Fig. 106, 9). Unpublished.
- 39)* *Wörgl, Tirol*: Among the stray finds from the older excavations are some iron bits. Mérey-Kádár 1959, pl. 7, 5–6.

XII. HUNGARY

- 1)* *Ártánd, Kom. Hajdu-Bihar, grave of 1939*: This grave contained one iron bit and two iron cheek-pieces. Párducz 1965a, 159, fig. 7, 1; pls 6, 2–3; 24, 3.
- 2)* *Cellőmölk, Kom. Vas, 'Kismező'*: At least one iron horse bit and one iron cheek-piece came from this tumulus grave. Lázár 1951, pl. 29, f.
- 3)* *Csöngye, Kom. Vas, tumulus I*: Lázár stated that this grave contained three iron bits; some further iron fragments illustrated by him could indicate the presence of more. Lázár 1955, pls 31, 19; 32, 8; note that Lázár does not mention in his text the horse bit on pl. 31, 18.
- 4)* *Füzesabony, Kom. Heves, grave 3*: This grave contained two bronze cheek-pieces. Gallus and Horváth 1939, pl. 2, 1–2.
- 5) *'Hungary', stray find*: Note that the bronze bit illustrated on Gallus and Horváth 1939, pl. 50, 1 very likely comes from Kleinklein (see above, XI/19a).
- 6)* *Mezőcsát, Kom. Borsod-Abaúj-Zemplén, grave 52*: This grave contained one iron bit. Patek 1974, 362, pl. 7, 1.2.5.
- 7)* *Nagybaráti, Kom. Győr-Sopron, tumulus I*: This grave contained three iron bits and six iron cheek-pieces. Rich horse-gear: type 5 (with ring-foot). Börzsönyi 1909, 249, fig. 2; 252, fig. 14; 253, figs 16–17.
- 8)* *Nagybaráti, Kom. Győr-Sopron, tumulus 2*: This grave contained three iron bits. Börzsönyi 1909, 252, fig. 13.
- 9)* *Nagybaráti, Kom. Győr-Sopron, tumulus to the west of tumulus I*: This grave contained three iron bits. Börzsönyi 1909.
- 10) *Nagyberki-Szalacska, Kom. Somogy, tumulus III*: Rich horse-gear: type 4. Kabay 1960, pl. 13, 19.
- 11) *Nagyberki-Szalacska, Kom. Somogy, tumulus V*: Rich horse-gear: type 5. Kabay 1960, pl. 14, 24–30.
- 12) *Nagyberki-Szalacska, Kom. Somogy, stray finds*: Rich horse-gear: type 4; also a rein-knob with central hemispherical boss and narrow flange (Fig. 103, 18). Darnay 1908, 143, figs 34–35.
- 13)* *Nagysomló-Doba, Kom. Vas, grave 1*: This grave contained a horse skeleton, an iron bit, two iron cheek-pieces and an iron sword. Rich horse-gear: type 3 (iron). Darnay et al. 1895, 319, pl. I.
- 14)* *Nagysomló-Doba, Kom. Vas*: A second grave from near Doba contained fragments of an iron bit or bits. Darnay 1899, 67; 68, pl. 25, 5.
- 15)* *Nagysomló-Doba, Kom. Vas*: Among the stray finds from this area are two iron bits, which probably came from graves. Darnay et al. 1895, 321, pl. II, 8; Darnay 1899, 69, pl. 26, 8; 72, pl. 28, 6.
- 16)* *Pécs-Jakabhegy, tumulus I*: This grave contained a bronze bit and two bronze cheek-pieces. Maráz 1978, 148; pl. 8, 8–10.
- 17)* *Somlószőlős (Sédváz), Kom. Veszprém*: Among the stray finds from this cemetery are various iron bits and cheek-pieces. Rich horse-gear: type 3 (iron). Darnay 1904, 73,

- figs 8–10; Gallus and Horváth 1939, pl. 60, 1.2.5; Bakay et al. 1970, 198; 202, fig. 60, 4.
- 18) *Somlóvásárhely, Kom. Veszprém, tumulus I*: Rich horse-gear: types 5 (variant, with ring-foot) and 6. Horváth 1969, 111, fig. 4, 3–9. See cat. no. 182.
- 19)* *Somlóvásárhely, Kom. Veszprém, tumulus 2*: This grave contained four iron bits. Horváth 1969, 114, fig. 9.
- 20)* *Somlóvásárhely, Kom. Veszprém*: Two iron bits and fragments of four or more bronze cheek-pieces are included in a possible grave ensemble from this cemetery. Rich horse-gear: types 3 (bronze) and 6. Gallus and Horváth 1939, pls 51, 1; 52.
- 21)* *Somlyóhegy, Kom. Veszprém*: Among the stray finds from Somlyóhegy is an iron cheek-piece. Rich horse-gear: types 3 (iron) and 5 (variant, with ring-foot). Gallus and Horváth 1939, pls 53, 5; 56, 5(1).
- 22)* *Süttő, Kom. Komárom*: This grave contained three iron bits and six iron cheek-pieces. Vadász 1983, 28, fig. 6, 1; 29, fig. 7, 1–2.
- 23)* *Százhalombatta, Kom. Pest, tumulus 114*: This grave contained one iron bit with two cheek-pieces made from boars' tusks. Holport 1985; Herceg 1985, 74, fig. 6.
- 24)* *Százhalombatta, Kom. Pest, tumulus 117*: This grave contained two iron trilobate objects which, according to Italian parallels (von Hase's 'Dreiringknebel vom Typ Veji'), may have been used as cheek-pieces. Holport 1985, fig. 21, 27–28.
- 25)* *Százhalombatta, Kom. Pest, tumulus 118*: This grave apparently contained iron bit fragments. Rich horse-gear: type 4 (variant). Holport 1985, 42, fig. 5, 6.
- 26)* *Szeged*: Among the stray finds from Szeged, which presumably come from a cemetery, is a fragmentary bronze bit. Gallus and Horváth 1939, pl. 48, 2.
- 27)* *Szentes-Vekerzug, Kom. Csongrád*: Apart from graves of single horses, this cemetery also contained several with paired horses with bits and cheek-pieces. Párducz 1952; 1954; 1955.
- 28)* *Vaskeresztes, Kom. Vas, tumulus I*: This grave contained a single iron bit. Fekete 1985, 40; 47, fig. 13, 3.
- 29)* *Vaskeresztes, Kom. Vas, tumulus II*: This grave contained a single iron bit and remains of iron attachments from the organic cheek-pieces. Fekete 1985, 52; 72, fig. 24, 3.7–10.
- 30)* *Vaszar, Kom. Veszprém, tumulus IV of 1968–9*: This tumulus was first excavated in 1932; the excavations of 1968–9 yielded two fragmentary iron horse-bits. Mithay 1980, 60, fig. 7, 1.6.
- 31)* *Vaszar, Kom. Veszprém, tumulus V of 1932*: The excavation of this grave uncovered three iron bits. Horváth 1969, 124, fig. 23, 6–8.
- 32)* *Vaszar, Kom. Veszprém, tumulus V of 1968–9*: Tumulus V was excavated a second time in 1968–9. To the west of the grave chamber were three iron bits. It is interesting to note that the rein-knobs and flat iron rings from the excavations of tumulus V were made of bronze in 1932 and iron in 1968–9. Presumably the two excavations uncovered two different sets of horse-gear and, most likely, two different graves. Mithay 1980, 60, fig. 7, 16–7; 62, fig. 9, 1 – see also the plan, p. 61, fig. 8, nos 9–10.
- 33)* *Vaszar, Kom. Veszprém, tumulus VII of 1968–9*: This grave had apparently not been disturbed by earlier excavations. The excavations of 1968–9 uncovered a single iron bit. Mithay 1980, 63, fig. 10, 20.
- 34)* *Vaszar, Kom. Veszprém, tumulus XII of 1968–9*: This grave had been disturbed; one iron bit was found by the excavations of 1968–9. Mithay 1980, 65, fig. 11, 10.

XIII. YUGOSLAVIA

- 1)* *Batina (Kiskőszeg)*: Among the stray finds from this cemetery is a bronze cheek-piece. Gallus and Horváth 1939, pl. 8, 5.
- 2)* *Borajna, Bosnia*: Among the stray finds from this cemetery are a pair of iron cheek-pieces. Rich horse-gear: type 3 (iron). Čović 1980, pl. 3, 2–3.
- 3)* *Boštanj, Slovenia, 'Bučni vrh'*: This tumulus grave contained one iron bit and two iron cheek-pieces. Guštin 1974, pl. 14, 5.
- 4)* *Brežec (Škocjan), Slovenia, 'Fondo Gombac', grave 165*: This grave contained fragments of two bronze bits and fragments of one or two bronze cheek-pieces. Loseri 1977, 6, fig. 1; 93–4; pl. 33, M-S.
- 5)* *Čitluci, Bosnia, tumulus I, grave 5*: This grave contained a single iron bit. Rich horse-gear: type 5 (variant, with ring-foot). Benac and Čović 1957, 75; pls 31, 20; 32, 1.
- 6)* *Kaptol, Slavonia, tumulus IV, grave 1*: This cremation grave contained a fragmentary bronze bit and a fragmentary bronze cheek-piece. Rich horse-gear: type 3 (bronze). Vejvoda and Mirmik 1973, pl. 2, 5.
- 7)* *Libna, Slovenia, 'Špilerjeva gomila' I, grave 6*: This grave contained two iron bits and at least two iron cheek-pieces, indicating harness for a pair of horses. Guštin 1976, pl. 9, 1.
- 8)* *Magdalenska gora, Slovenia, tumulus IV, grave 43*: This grave contained fragments of an iron bit or bits. Rich horse-gear: type 6 (variant). Hencken 1978, 131, fig. 85, c-f-l-m; 132, fig. 86, h.
- 9)* *Magdalenska gora, Slovenia, tumulus VII, grave 39*: This grave contained a single iron bit. Hencken 1978, 237, fig. 259, b.
- 10)* *Most na Soči (S. Lucia), Slovenia, grave 592*: This grave contained a horse skeleton, an iron bit, phalerae and bronze sockets from organic cheek-pieces. Teržan et al. 1985, pl. 51, 11–15.
- 11)* *Novo mesto, Slovenia, 'Malenšek', grave 1*: This grave contained two bronze cheek-pieces and remains of a bronze bridle. Guštin and Teržan 1977, pl. 1, 1–2.
- 12)* *Novo mesto, Slovenia, Tripod Grave*: This grave contained one iron bit. Rich horse-gear: type 5 (with ring-foot). Gabrovec 1968, pls 2, 6–8; 3, 4.
- 13)* *Novo mesto, Slovenia, Armour Grave*: This grave contained remains of one iron bit. Gabrovec 1960, pl. 8, 10.
- 14)* *Novo mesto, 'Marof', tumulus I, grave 16*: This warrior grave, excavated in 1987, contained a single iron bit. Unpublished; personal communication T. Knez and M. Egg.
- 15)* *Osovo, Bosnia, tumulus II, grave 1*: This grave contained one iron bit and two iron cheek-pieces. Fiala 1899, 39–43; 42, fig. 24; Benac and Čović 1957, pl. 26, 1.
- 15a)* *Reva, near Dobrič, Slovenia, tumulus 22*: This grave contained one iron bit. Parzinger 1989, pls 42–3.
- 16)* *Ritopek, Serbia, grave 12*: This grave contained one iron bit and one iron cheek-piece. Rich horse-gear: type 3 (iron). Todorović 1966, pl. 2, 13.
- 17)* *Šmarjeta, Slovenia*: Among the stray finds from this cemetery is an iron bit. Stare 1973, pl. 8, 14.
- 18)* *Stična, Slovenia, excavations of the Narodni muzej, tumulus I, grave 72*: This grave contained one iron bit. Rich horse-gear: type 4 (variant). Gabrovec 1966, 16, fig. 8, 10–11.13.
- 19)* *Stična, Slovenia, tumulus IV, grave 41*: This grave contained one iron bit. Rich horse-gear: type 5 (with ring-foot). Wells 1981, 181, fig. 95, c.e.

- 20)* *Stična, Slovenia, tumulus V, grave 15*: This grave contained one iron bit. Wells 1981, 194, fig. 125, d.
- 21)* *Stična, Slovenia, tumulus VI, grave 18*: This grave contained one fragmentary iron bit. Wells 1981, 207, fig. 149, e.
- 22)* *Stična, Slovenia, tumulus VI, grave 29*: This grave contained one iron bit. Wells 1981, 212, fig. 159, a.
- 23)* *Stična, Slovenia, tumulus of 1935*: This grave contained one iron bit. Rich horse-gear: type 4 (variant). Kromer and Gabrovec 1962, pl. 4, 23–25.
- 24)* *Stična, Slovenia, Armour Grave*: This grave contained one iron bit. Rich horse-gear: type 4 (variant). Gabrovec 1966, 12, fig. 6, 13–14.29.
- 25) *Sv. Lovrenc, Slovenia*: Rich horse-gear: type 5 (variant, with ring-foot). Starè 1955b, pl. I, 3.
- 26)* *Trnovo, Slovenia*: Among the stray finds from this cemetery are three iron bits. Guštin 1979, pl. 12, 1–3.
- 27)* *Vače, Slovenia*: Among the stray finds from this cemetery is an iron bit. Rich horse-gear: type 5. Starè 1955a, pls 17, 1; 40, 7.
- 28) *Vitina, Hercegovina, stray find*: Rich horse-gear: type 4. Truhelka 1895, 524, fig. 58.

XIV. ALBANIA

- 1)* *Urakë, Mati, tumulus I, grave 5*: This warrior grave, with a bronze cuirass, an iron sword and two iron spearheads, also contained one iron bit and two iron cheek-pieces. Islami 1982, 147, pl. 1, 1.

XV. ROMANIA

- 1)* *Aiud (Nagy-Enyed), jud. Alba, 'Winzerschule'*: Among finds from this locality are two iron bits and at least two iron cheek-pieces; it is not certain whether they belong to a single grave. Rich horse-gear: type 5 (with ring-foot). Párducz 1965b; Vasiliev 1980, pls 16, 6–12.17.19; 17, 4.
- 2)* *Balta Verde, jud. Mehedinți, tumulus 2*: This grave contained two bronze cheek-pieces. Berciu 1934.
- 3)* *Cepari, jud. Argeș, 'Toplița', tumulus 5*: This grave contained one iron bit and two iron cheek-pieces. Rich horse-gear: type 5 (variant). Popescu and Vulpe 1982, 86, fig. 11, d–e.
- 4)* *Cîpău (formerly Maroscapó), jud. Mureș, tumulus VIII*: This grave contained one iron bit. Vlassa 1961, 30, fig. 9.
- 5)* *Cîpău (formerly Maroscapó), jud. Mureș, tumulus A*: This grave contained one iron bit and two iron cheek-pieces. Rich horse-gear: type 3 (iron). Darnay 1909, 165–8; Gallus and Horváth 1939, pl. 59B, 3–4.
- 6)* *Cristești, jud. Mureș, grave 9*: This grave contained one iron bit and two iron cheek-pieces. Rich horse-gear: type 3 (iron, variant). Crișan 1965, 55–63; 60, fig. 12.
- 7)* *Ferigile, jud. Vilcea, tumulus 2, grave 1*: This grave contained one iron bit. Vulpe 1967, 108.
- 8)* *Ferigile, jud. Vilcea, tumulus 6, grave 1*: This grave contained one iron bit and two iron cheek-pieces. Vulpe 1967, 112–3.
- 9)* *Ferigile, jud. Vilcea, tumulus 11, grave 1*: This grave contained one iron bit and two iron cheek-pieces. Vulpe 1967, 117–8.

- 10)* *Ferigile, jud. Vilcea, tumulus 27, grave 1*: This grave contained one iron bit and two iron cheek-pieces. Vulpe 1967, 124–5.
- 11)* *Ferigile, jud. Vilcea, tumulus 34, grave 1*: This grave contained one iron cheek-piece. Vulpe 1967, 127.
- 12)* *Ferigile, jud. Vilcea, tumulus 41*: This tumulus contained two different iron cheek-pieces and one iron bit; it is uncertain whether they belong to the same grave. Vulpe 1967, 131–2.
- 13)* *Ferigile, jud. Vilcea, tumulus 69, grave 1*: This grave contained one iron bit and two iron cheek-pieces. Vulpe 1967, 144–5.
- 14)* *Ferigile, jud. Vilcea, tumulus 76, grave 1*: This grave contained two different iron bits. Vulpe 1967, 151.
- 15)* *Ferigile, jud. Vilcea, tumulus 86*: This tumulus contained one iron bit and two iron cheek-pieces. Vulpe 1967, 158.
- 16)* *Ferigile, jud. Vilcea, tumulus 90*: This tumulus contained one iron bit. Vulpe 1967, 160–1.
- 17)* *Ferigile, jud. Vilcea, tumulus 93, grave 1*: This grave contained one iron cheek-piece. Vulpe 1967, 162.
- 18)* *Ferigile, jud. Vilcea, tumulus 110*: This grave contained one iron bit and two iron cheek-pieces. Vulpe 1967, 172–3.
- 19)* *Gura Padinei, jud. Olt, grave 4*: This grave contained one iron bit and two bronze cheek-pieces. Berciu 1939, 166, fig. 210.
- 20)* *Tigveni, jud. Argeș, 'Babe', tumulus 15, grave 1*: This grave contained one iron bit and one bronze cheek-piece. Popescu and Vulpe 1982, 97, fig. 17, 1–4.a–b.d.g.i; 98, fig. 18.

XVI. BULGARIA

- 1)* *Dobrina, okr. Varna, tumulus 12*: This grave contained one iron bit and two iron cheek-pieces. Mirtchev 1965, pl. 12, 44.
- 2)* *Sofronievo, okr. Vraca*: One iron bit was found in this unprofessionally-excavated tumulus. Hänsel 1976, 172; pl. 68, 4.

XVII. ITALY

The distribution of horse-gear graves in Italy has been taken from the catalogue of F.-W. von Hase (von Hase 1969). The graves from Verucchio, 'predio Moroni', excavated in 1969 (including seven graves with paired horse bits), Este, 'Casa di Ricovero', grave 232 (one iron horse bit) and Como, 'Vigna di Mezzo' (a grave of Golasecca IA2, containing two bronze horse bits) have been added (Montanari 1985; Frey 1969, pl. 27, 1; De Marinis 1975, 246, pl. 14, 5). Items of rich horse-gear are only known from three graves:

- 1) *Como, Ca'Morta, 'Tomba con Carrettino'*: Rich horse-gear: type 3 (iron). Bertolone 1957, pl. C, fig. 3, 1–2.
- 2) *Sesto-Calende, Warrior Grave B*: Rich horse-gear: type 10; also rein-knobs with central nipple and broad flange (Figs 105, 4; 106, 3). Ghislanzoni 1944, fig. 48, b; De Marinis 1975, 230, pl. 7, 7–9.
- 3) *Tarquini, 'Warrior Grave'*: Rich horse-gear: type 6 (with ring-foot). Kilian 1977, 46, fig. 10, 10–16.

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